WATER-RESOURCES REPORT NUMBER THIRTY-THREE
ARIZONA STATE LAND DEPARTMENT
OBED M. LASSEN, COMMISSIONER

WACA

1912

BASIC GROUND-WATER DATA FOR SOUTHERN COCONINO COUNTY ARIZONA

BY E. H. McGAVOCK

PREPARED BY THE GEOLOGICAL
SURVEY, UNITED STATES DEPARTMENT
OF THE INTERIOR

PHOENIX, ARIZONA
MARCH 1968

ARIZONA STATE LAND DEPARTMENT WATER-RESOURCES REPORTS

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No.

* 1. Pumpage and ground-water levels in Arizona in 1955, by P. W. Johnson, N. D. White, and J. M. Cahill: 69 p., 30 figs., 1956.

* 2. Annual report on ground water in Arizona, spring 1956 to spring 1957, by J. W. Harshbarger and others: 42 p., 18 figs., 1957.

* 3. Geology and ground-water resources of the Harquahala Plains area, Maricopa and Yuma Counties, Arizona, by D. G. Metzger: 40 p., 2 pls., 7 figs., 1957.

* 4. Geology and ground-water resources of the Palomas Plain-Dendora Valley area, Maricopa and Yuma Counties, Arizona, by C. A. Armstrong and C. B. Yost, Jr.: 49 p., 3 pls., 4 figs., 1958.

* 5. Annual report on ground water in Arizona, spring 1957 to spring 1958, by W. F. Hardt, J. M. Cahill, and M. B. Booher: 60 p., 19 figs., 1958.

* 6. Annual report on ground water in Arizona, spring 1958 to spring 1959, by W. F. Hardt, R. S. Stulik, and M. B. Booher: 61 p., 18 figs., 1959.

* 7. Annual report on ground water in Arizona, spring 1959 to spring 1960, by W. F. Hardt, R. S. Stulik, and M. B. Booher: 89 p., 22 figs., 1960.

* 8. Geology and ground-water resources of the McMullen Valley, Maricopa, Yavapai, and Yuma Counties, Arizona, by William Kam: 72 p., 17 figs., 1961.

9. Hydrologic data and drillers' logs, Papago Indian Reservation, Arizona, by L. A. Heindl and O. J. Cosner, with a section on chemical quality of the water by L. R. Kister: 116 p., 3 figs., 1961.

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*12A. Geohydrologic data in the Navajo and Hopi Indian Reservations, Arizona, New Mexico, and Utah—Part I, Records of ground-water supplies, by G. E. Davis, W. F. Hardt, L. K. Thompson, and M. E. Cooley: 159 p., 3 figs., 1963.

*12B. Geohydrologic data in the Navajo and Hopi Indian Reservations, Arizona, New Mexico, and Utah—Part II, Selected chemical analyses of the ground water, by L. R. Kister and J. L. Hatchett: 58 p., 2 figs., 1963.

12C. Geohydrologic data in the Navajo and Hopi Indian Reservations, Arizona, New Mexico, and Utah—Part III, Selected lithologic logs, drillers' logs, and stratigraphic sections, by M. E. Cooley, J. P. Akers, and P. R. Stevens: 157 p., 3 figs., 1964.

12D. Geohydrologic data in the Navajo and Hopi Indian Reservations, Arizona, New Mexico, and Utah—Part IV, Maps showing locations of wells, springs, and stratigraphic sections, by M. E. Cooley and others: 2 sheets, 1966.

12E. Geohydrologic data in the Navajo and Hopi Indian Reservations, Arizona, New Mexico, and Utah—Part I-A, Supplemental records of ground-water supplies, by E. H. McGavock, R. J. Edmonds, E. L. Gillespie, and P. C. Halpenny: 55 p., 4 figs., 1966.

13. Desert floods—a report on southern Arizona floods of September 1962, by D. D. Lewis: 13 p., 18 figs., 1963.

*14. Basic ground-water data of the Willcox basin, Graham and Cochise Counties, Arizona, by S. G. Brown, H. H. Schumann, L. R. Kister, and P. W. Johnson: 93 p., 15 figs., 1963.

*15. Annual report on ground water in Arizona, spring 1962 to spring 1963, by N. D. White, R. S. Stulik, E. K. Morse, and others: 136 p., 47 figs., 1963.

16. Effects of ground-water withdrawal in part of central Arizona projected to 1969, by N. D. White, R. S. Stulik, and C. L. Rauh: 25 p., 7 figs., 1964.

(Continued on inside back cover)

WATER - RESOURCES REPORT NUMBER THIRTY - THREE

ARIZONA STATE LAND DEPARTMENT

OBED M. LASSEN, COMMISSIONER

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BASIC GROUND - WATER DATA FOR SOUTHERN COCONINO COUNTY ARIZONA

BY E. H. McGAVOCK

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BASIC GROUND-WATER DATA FOR SOUTHERN COCONINO COUNTY, ARIZONA

By E. H. McGavock

Introduction

In July 1964 the U. S. Geological Survey in cooperation with the Arizona State Land Department, O. M. Lassen, Commissioner, began an investigation of the water resources of southern Coconino County. The purpose of this report is to make available basic ground-water data that are useful in planning and studying water-resources development in the area and to supplement the interpretive report, which will be published later.

The tabulated and illustrated data include information on springs and on wells drilled from 1900 to 1967. Most of the well data, logs, well discharges, and reported drawdowns were obtained from the records of well owners and drillers. Water levels in most of the wells were measured by personnel of the U.S. Geological Survey.

Southern Coconino County encompasses about 10, 600 square miles, most of the land is used for grazing. The area is bounded on the east, south, and west by the county line and on the north by the Colorado and Little Colorado Rivers (fig. 1). The principal centers of population are Flagstaff, Sedona, and Williams. The city of Winslow in Navajo County also obtains its water supply from wells in Coconino County.

The well and spring records are arranged in numerical order by township, range, and section under the well-numbering system used in Arizona in accordance with the Bureau of Land Management's system of land subdivision (fig. 2).

Acknowledgments and Personnel

The author appreciates the cooperation of the well owners and drillers who contributed information for this report. Messrs. H. F. Dunnam of the city of Flagstaff, R. B. Stinson of the city of Winslow, and M. B. McCutchan of the Arizona Water Co., provided valuable information on municipal wells in the area. Special thanks are due Mr. W. J. Breed, Museum of Northern Arizona, and Mr. J. R. Scurlock, State of Arizona Oil and Gas Conservation Commission, for permitting access to their records.

This investigation was conducted under the immediate supervision of H. M. Babcock, district chief of the Water Resources Division in Arizona. Substantial contributions, including the basic-data collection, were made by personnel of the Arizona district. Those deserving special mention are E. L. Gillespie, J. W. H. Blee, and L. J. Mann.

Explanation of Illustrations and Tables

Included in this report are tables of well records, spring records, drillers' logs, and chemical analyses of ground water. The main illustration shows the location of wells and springs and the altitude of the water level as of June 1967.

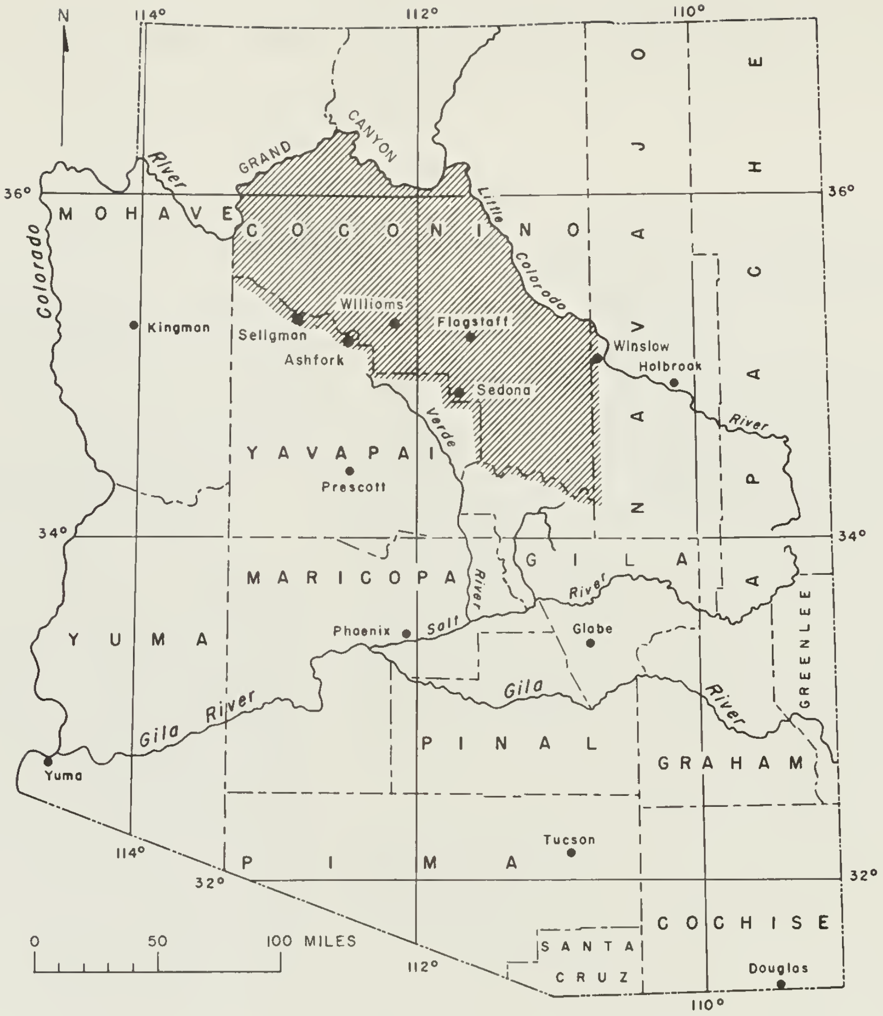
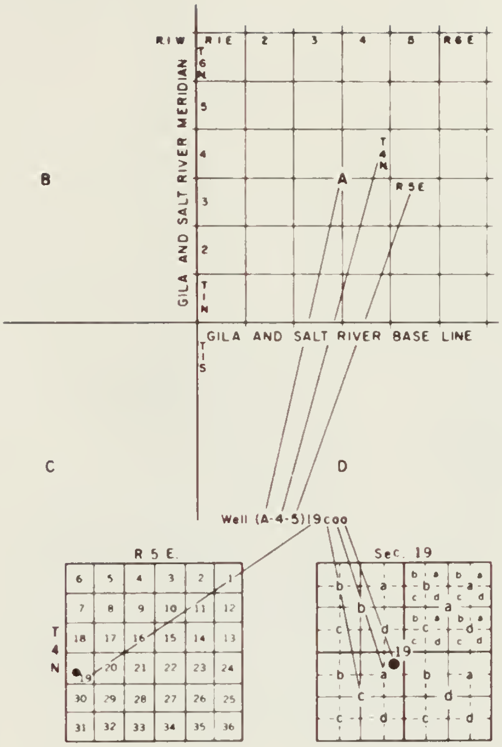


Figure 1. --Area of report.

Illustrations. - - Figure 3 shows the stratigraphic names and generalized distribution of the rocks and sediments in southern Coconino County. Rocks of Triassic age and younger occur in the entire area, but some rocks of Permian age and older are present only in the northwest part of the area. Figure 3, therefore, is divided into northwest and southeast sections where applicable.

Figure 4 shows the locations of selected wells and springs listed in tables 1 and 2; the wells and springs for which chemical analyses are included in table 4; and the altitude of the water level, in feet above mean sea level, in the Coconino Sandstone and Supai Formation in the eastern half of the area. The contour lines shown on the map connect points of equal altitude of the water level and depict the shape of the water-table surface. Figure 4 also shows the altitude of all springs listed in table 2, the altitude of the water level in isolated wells, and the altitude of the bottom of dry holes in the western half of the area.

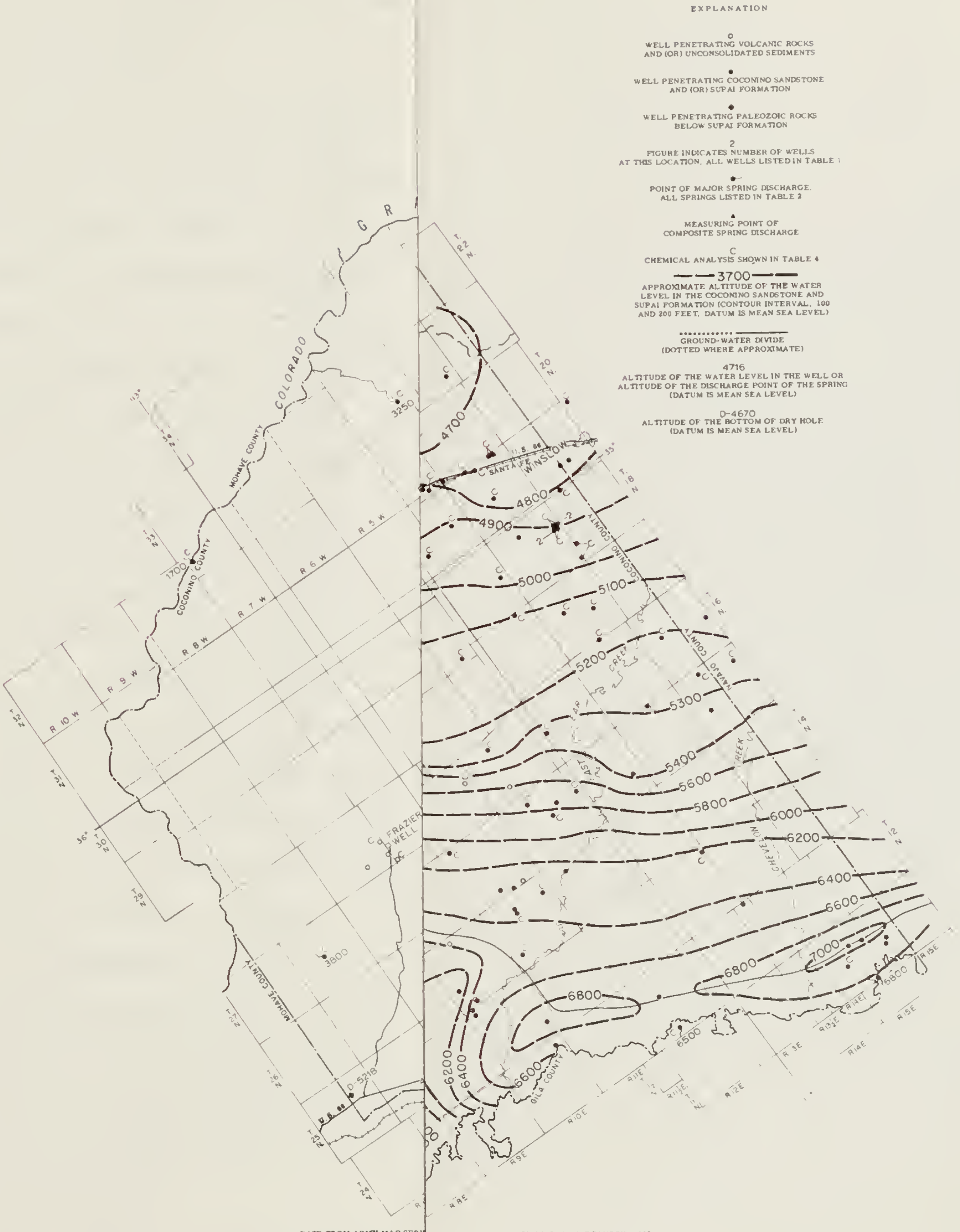


The well numbers used by the Geological Survey in Arizona are in accordance with the Bureau of Land Management's system of land subdivision. The land survey in Arizona is based on the Gila and Salt River meridian and base line, which divide the State into four quadrants. These quadrants are designated counterclockwise by the capital letters A, B, C, and D. All land north and east of the point of origin is in A quadrant, that north and west in B quadrant, that south and west in C quadrant, and that south and east in D quadrant. The first digit of a well number indicates the township, the second the range, and the third the section in which the well is situated. The lowercase letters a, b, c, and d after the section number indicate the well location within the section. The first letter denotes a particular 160-acre tract, the second the 40-acre tract, and the third the 10-acre tract. These letters also are assigned in a counterclockwise direction, beginning in the northeast quarter. If the location is known within the 10-acre tract, three lowercase letters are shown in the well number. In the example shown, well number (A-4-5)19caa designates the well as being in the NE$\frac{1}{4}$NE$\frac{1}{4}$SW$\frac{1}{4}$ sec. 19, T. 4 N., R. 5 E. Where there is more than one well within a 10-acre tract, consecutive numbers beginning with 1 are added as suffixes.

Figure 2.--Well-numbering system in Arizona.

SYSTEM	STRATIGRAPHIC UNIT
QUATERNARY	Alluvium Volcanic rocks
TERTIARY	Volcanic rocks and silt, sand, and gravel
CRETACEOUS	Sandstone; present in southeastern corner of the county
TRIASSIC	Chinle Formation Petrified Forest Member Shinarump Member Moenkopi Formation
PERMIAN	Kaibab Limestone Toroweap Formation; present north and west of Verde Valley Coconino Sandstone Hermit Shale; present in the Grand Canyon area
PERMIAN AND PENNSYLVANIAN	Supai Formation
PENNSYLVANIAN	Naco Formation; present in southeastern part of area east of Verde Valley Limestone unit; present in area of Hualapai Indian Reservation
MISSISSIPPIAN	Redwall Limestone
DEVONIAN	Martin Limestone; present east and south of Hualapai Indian Reservation Temple Butte Limestone; present in eastern Grand Canyon Limestone unit; present near Hualapai Indian Reservation
CAMBRIAN	Muav Limestone; present north of Verde Valley Bright Angel Shale; present north of Verde Valley Tapeats Sandstone
PRECAMBRIAN	Mainly granite, gneiss, and schist

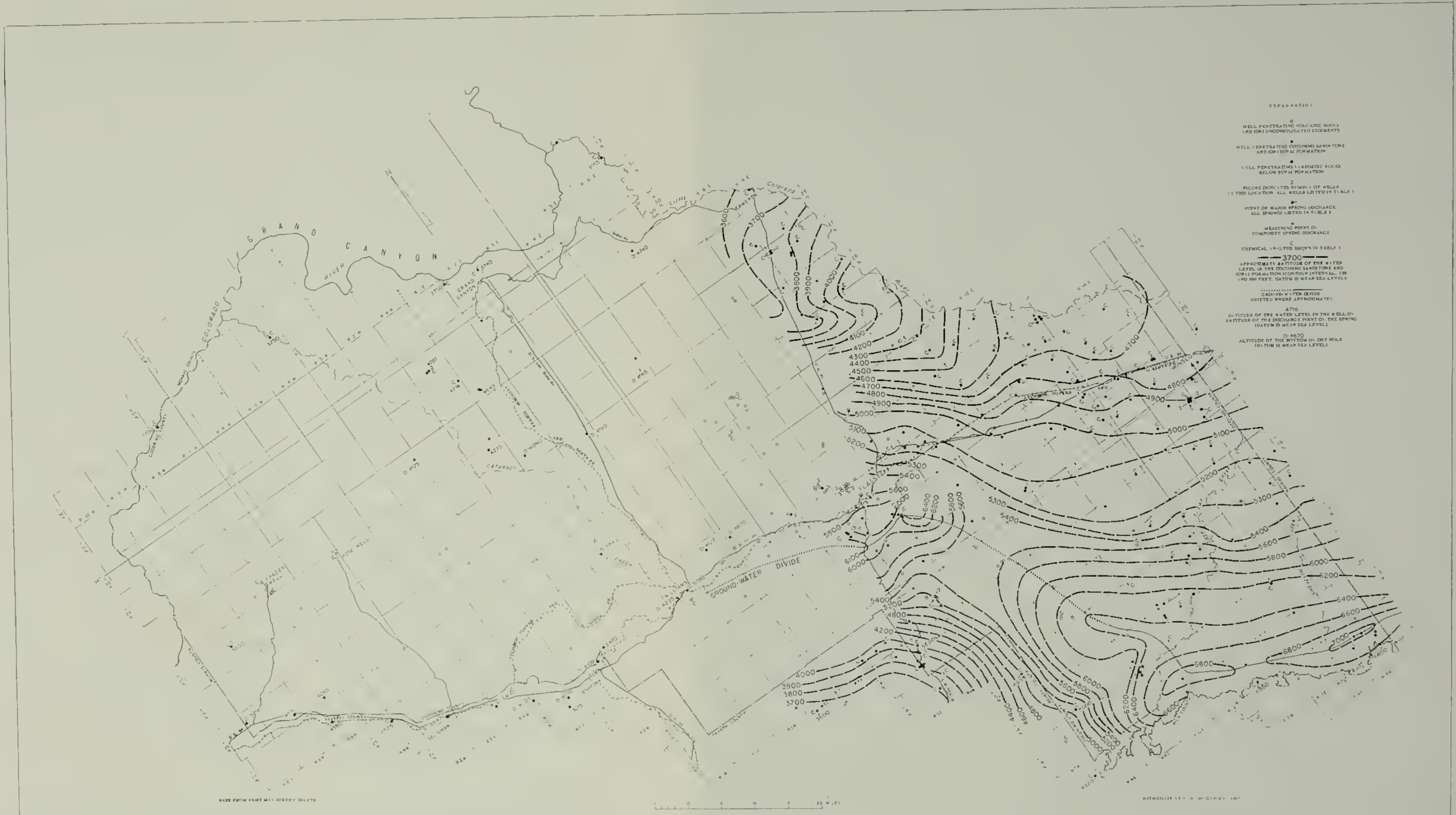
Figure 3. --Stratigraphic units in southern Coconino County.


EXPLANATION
○
WELL PENETRATING VOLCANIC ROCKS AND (OR) UNCONSOLIDATED SEDIMENTS
●
WELL PENETRATING COCONINO SANDSTONE AND (OR) SUPAI FORMATION
◆
WELL PENETRATING PALEOZOIC ROCKS BELOW SUPAI FORMATION
2
FIGURE INDICATES NUMBER OF WELLS AT THIS LOCATION. ALL WELLS LISTED IN TABLE 1
POINT OF MAJOR SPRING DISCHARGE. ALL SPRINGS LISTED IN TABLE 2
▲
MEASURING POINT OF COMPOSITE SPRING DISCHARGE
C
CHEMICAL ANALYSIS SHOWN IN TABLE 4
3700
APPROXIMATE ALTITUDE OF THE WATER LEVEL IN THE COCONINO SANDSTONE AND SUPAI FORMATION (CONTOUR INTERVAL, 100 AND 200 FEET. DATUM IS MEAN SEA LEVEL)
GROUND-WATER DIVIDE (DOTTED WHERE APPROXIMATE)
4716
ALTITUDE OF THE WATER LEVEL IN THE WELL OR ALTITUDE OF THE DISCHARGE POINT OF THE SPRING (DATUM IS MEAN SEA LEVEL)
D-4670
ALTITUDE OF THE BOTTOM OF DRY HOLE (DATUM IS MEAN SEA LEVEL)
G R
COLORADO
MOHAVE COUNTY
COCONINO COUNTY
NAVAJO COUNTY
GILA COUNTY
WINSLOW
SANTA FE
U.S. 66
FRAZIER WELL
CHEVELON
CREEK
R 10 W
R 9 W
R 8 W
R 7 W
R 6 W
R 5 W
T. 22 N.
T. 20 N.
T. 18 N
T. 16 N.
T. 14 N
T. 12 N
36°
35°
3250
1700
3800
D 5218
4700
4800
4900
5000
5100
5200
5300
5400
5600
5800
6000
6200
6400
6600
6800
7000
6500

BASE FROM ARMY MAP SERV

HYDROLOGY BY E. H. MCGAVOCK 1967

FIGURE STONE AND SUPAI


EXPLANATION
WELL PENETRATING VOLCANIC ROCKS AND (OR) UNCONSOLIDATED SEDIMENTS
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D-4670
ALTITUDE OF THE BOTTOM OF DRY HOLE (DATUM IS MEAN SEA LEVEL)
GRAND CANYON
COLORADO RIVER
GROUND-WATER DIVIDE
CATARACT
BASE FROM ARMY MAP SERVICE SHEETS
0 5 10 15 20 MILES

FIGURE 4.--LOCATION OF SELECTED WELLS AND SPRINGS AND ALTITUDE OF THE WATER LEVEL IN THE COCONINO SANDSTONE AND SUPAI FORMATION, JUNE 1967, SOUTHERN COCONINO COUNTY.

Table 1. --The well records in this table are for selected wells in the area and for some wells in adjacent counties. Table 1 is cross-referenced with tables 3 and 4, and the locations of the wells listed in table 1 are shown in figure 4.

Table 1 includes the well-location number, the reported depth of the well, and the diameter of the casing. Land-surface altitudes were determined from the best available topographic maps or with an aneroid altimeter. The principal stratigraphic units that yield water to the well are listed under the heading "Water-bearing strata." The static water level is the water level below land surface when the well is not being pumped. Most of the bail or pump-test data were reported by well drillers or owners. When only the pumping rate is shown, the figure refers to the pumping rate during normal operation; otherwise, the figure is the rate of discharge during a bail or pump test. The drawdown is the amount of lowering of the water level caused by pumping the well at a given rate. The duration of the test is the time necessary to produce the drawdown at the given rate. The primary use for which the water is withdrawn is shown in the column "Use of water." The availability of supplementary information in tables 3 and 4 is indicated by appropriate symbols in the columns headed "Well log" and "Chemical analysis." The remarks column contains supplementary data, such as the name of the well, reported well deepenings, and other information.

Table 2. -- The spring records included in this table are for selected springs in and near the report area. The locations of springs listed in table 2 are shown in figure 4. The geologic formations listed under the heading "Source rock" refer to the formations from which the springs actually discharge, and these formations may not be the principal reservoir rock. The range of measurements is the range of discharge measurements or estimates made at the spring. The symbol T4 under the heading "Chemical analysis" indicates that a chemical analysis of the water from the spring is included in table 4. The names of the springs and other data are shown in the remarks column.

Table 3. --Table 3 contains selected drillers' logs that are considered to be representative or that have special geologic or hydrologic significance. The drillers' rock descriptions have been retained, and the stratigraphic correlations have been added by the author. By comparing the driller's rock description with known thicknesses and descriptions of the rocks on the surface, most of the stratigraphic units can be recognized. Stratigraphic correlations are listed as undifferentiated in many logs where minor differences in the rock units are not reflected in the driller's description. The locations of wells listed in table 3 are shown in figure 4.

Table 4. -- Table 4 contains laboratory analyses of the water from selected wells and springs. The locations of wells and springs listed in table 4 are shown in figure 4.

The Director of the U. S. Geological Survey has approved the change in reporting of Survey water-quality data from the English system to metric system. Therefore, the water-quality data in this report are given in milligrams per liter (mg/l), degrees Celsius (°C), and micromhos at 25°C. The terms "parts per million" and "milligrams per liter" are practically synonymous for water containing as much as 5,000 to 10,000 mg/l of dissolved solids. The exact amount is dependent on the nature of the dissolved material. The Survey has set 7,000 mg/l dissolved solids as the point above which the difference in parts per million and milligrams per liter becomes significant. In order to convert data from one system to the other, a density factor must be applied to the analytical results of all water containing more than 7,000 mg/l of dissolved solids.

Temperature data given in tables 1 and 4 can be converted to degrees Fahrenheit (°F) by using the chart shown below.

°F	°C	°F	°C	°F	°C	°F	°C
32	0	55	13	78	26	101	38
33	1	56	13	79	26	102	39
34	1	57	14	80	27	103	39
35	2	58	14	81	27	104	40
36	2	59	15	82	28	105	41
37	3	60	16	83	28	106	41
38	3	61	16	84	29	107	42
39	4	62	17	85	29	108	42
40	4	63	17	86	30	109	43
41	5	64	18	87	31	110	43
42	6	65	18	88	31	111	44
43	6	66	19	89	32	112	44
44	7	67	19	90	32	113	45
45	7	68	20	91	33	114	46
46	8	69	21	92	33	115	46
47	8	70	21	93	34	116	47
48	9	71	22	94	34	117	47
49	9	72	22	95	35	118	48
50	10	73	23	96	36	119	48
51	11	74	23	97	36	120	49
52	11	75	24	98	37	121	49
53	12	76	24	99	37	122	50
54	12	77	25	100	38		

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TABLES

Table 1. --Records of selected wells in southern Coconino County

Location: See p. 3 for description of well-numbering and location system.
Static water level: R, reported.
Bail or pump-test data: R, reported.
Use of water: D, domestic; Ind, industrial; Irr, irrigation; N, none; PS, public supply; S, stock.

Well log: T3, log included in table 3.
Chemical analysis: T4, chemical analysis included in table 4.
Remarks: ATT, American Telephone and Telegraph Co.; EPNG, El Paso Natural Gas Co.; P.M., Bureau of Indian Affairs, Branch of Plant Management; T.P., trading post.

Location	Date completed (month, year)	Reported depth of well (feet)	Diameter of casing (inches)	Land-surface altitude (feet above mean sea level)	Water-bearing strata	Static water level		Bail or pump-test data			Use of water	Well log	Chemical analysis	Remarks
						Feet below land surface	Date measured	Rate (gpm)	Drawdown (feet)	Duration of test (hours)				
(A-11-14)13aca	......	650	......	7,555	Coconino Sandstone	403	6-14-66	......	......	......	D	.....	......	
14bab	1956	685	......	7,500	..... do	435 R	8- -59	......	......	......	D, Ind	.....	......	Manganese Mine well.
22cbd	7-66	915	6	7,575	Coconino Sandstone and Supai(?) Formation.	680	8-9-66	17	54	3½	PS	.....	T4	Canyon Point well.
(A-11-15)19dda	......	......	......	7,460	Coconino Sandstone	598	6-14-66	......	......	......	D	.....	......	
20bdc	......	......	......	7,550	..... do	697	6-14-66	......	......	......	D	.....	......	
(A-12-10)1cab	1-64	743	......	7,346	Supai(?) Formation	731 R	1-4-64	......	......	......	N	.....	......	Phelps-Dodge No. 20.
(A-12-12)16acb	12-64	963	5	7,425	Coconino Sandstone and Supai(?) Formation.	649	12-16-64	9	126	1	PS	.....	......	Knoll Lake well; temperature 11°C.
(A-12-13½)1bbd	7-64	812	6	7,160	Coconino Sandstone	750 R	7-22-64	......	......	......	D	T3	......	Dye Ranch well.
(A-13-7)14bab	1963	800	6	5,955	Volcanic rocks, sand, and gravel.	752	9-22-66	......	......	......	S	T3	T4	Mud Tanks well.
(A-13-10)6ada	8-64	627	......	6,865	Coconino Sandstone	468	7-13-66	......	......	......	......	.....	......	Fuller No. 2 well.
6daa	8-64	567	......	6,865	..... do	347	7-13-66	395 R	31 R	72	N	.....	......	Fuller No. 1 well.
25caa	10-63	726	......	7,334	..... do	427 R	6-10-64	......	......	......	N	T3	......	Phelps-Dodge No. 14.
(A-13-13)1ddb	5-52	905	8	7,010	..... do	764	6-13-66	16.5	......	4⅓	D	.....	T4	Chevelon Ranger Station well.
(A-14-10)4ac	......	14	48	6,740	Alluvium	7.6	7-20-66	......	......	......	S	.....	......	Dug well.
30aca	1954	1,050	......	6,900	Coconino Sandstone	867	7-13-66	......	......	......	Ind(?)	.....	......	
32db	......	23	......	6,850	Alluvium	15 R	1946	......	......	......	N	.....	......	Do.
32dbd	6-63	600	17	6,855	Coconino Sandstone	344	6-9-66	525 R	20 R	24 R	D	.....	......	
(A-14-11)9adc	11-66	670	8	6,905	..... do	532	11-22-66	43	21	8½	PS	T3	......	Blue Ridge Maintenance Camp well; temperature 13°C.
9dca	9-58	665	8	6,885	..... do	495	11-22-66	48	20	1½	PS	T3	T4	Timber Ranger Station well.
12bcd	7-34	477	6	6,730	..... do	358	7-21-66	......	......	......	D, S	T3	T4	Moqui Ranch well.
30ddd	10-65	1,000	5	7,323	.... do	841	10-21-65	11	5	16	PS	.....	T4	Rock Crossing well.
(A-14-12)8add	5-66	301	4	6,270	..... do	12	6-8-66	......	......	......	N	.....	......	Macks Crossing observation well.
(A-15-11)5bdc	......	800	8	6,710	..... do	640	6-22-66	......	......	......	D, S	.....	T4	Haylake Ranch well.
33adb	......	550	10	6,740	..... do	430	9-20-66	......	......	......	D	.....	......	
34dcd	1964	600	6	6,825	..... do	461	9-20-66	......	......	......	PS	.....	......	
35dad	......	40	6	6,725	Alluvium	Dry	9-20-66	......	......	......	N	.....	......	Fisher well.
(A-15-12)4ccc	11-47	778	8	6,410	Coconino Sandstone	628	12-2-66	......	......	......	D, S	.....	T4	South Quail well.

Table 1. --Records of selected wells in southern Coconino County—Continued

Location	Date completed (month, year)	Reported depth of well (feet)	Diameter of casing (inches)	Land-surface altitude (feet above mean sea level)	Water-bearing strata	Static water level: Feet below land surface	Static water level: Date measured	Bail or pump-test data: Rate (gpm)	Bail or pump-test data: Drawdown (feet)	Bail or pump-test data: Duration of test (hours)	Use of water	Well log	Chemical analysis	Remarks
(A-15-12)14bba	1957(?)	875	6	6,480	Coconino Sandstone	800 R	5-11-66	......	......	......	D, S	.....	......	
15ddc	......	780	8	6,520	do	678	5-5-66	......	......	......	S	.....	T4	AZ Ranch well.
(A-15-13)18cba	......	800	......	6,360	do	718	5-5-66	......	......	......	S	.....	T4	Red Hill well.
25bbb	......	1,120	10	6,450	do	1,077	5-5-66	......	......	......	S	.....	......	Tillman-Ellsworth well.
(A-15-14)3bbb	6-50	825	8	6,010	do	732	11-22-66	......	......	......	S	.....	T4	
(A-15-15)4bdc	......	850	8	5,950	do	694	11-22-66	......	......	......	S	.....	T4	
12bbc	......	......	8	5,900	do	718	12-2-66	......	......	......	S	.....	T4	
20cbc	......	......	8	6,160	do	815	11-22-66	......	......	......	D, S	.....	......	
(A-16-5)24acc	1963	460	8	4,000	Supai Formation	274	1-16-67	30 R	50 R	2	PS	.....	T4	Rancho Rojo No. 1 well.
(A-16-6)8ccd	......	625	8	4,255	do	446	1-16-67	20 R	115 R	......	PS	.....	T4	Casa de Corte well.
(A-16-9)28cba	1944(?)	125	8	7,495	Volcanic rocks	42	9-22-66	......	......	......	PS	.....	......	
28cbc	7-61	97	8	7,495	Volcanic rocks and silt	39	9-22-66	25 R	3 R	1½	PS	T3	T4	Happy Jack well; plugged hack from 135 feet.
34cab	1966	215	......	7,255	Volcanic rocks	Dry R	1966	......	......	......	N	.....	......	
(A-16-11)13bca	......	12	72	6,575	Alluvium	8.0	11-22-66	......	......	......	N	.....	T4	Chavez well; dug well.
(A-16-12)9bbb	1930	1,000	8.5	6,210	Coconino Sandstone	946 R	1949	......	......	......	S	.....	T4	Deep well.
29ddd	11-33	36	6	6,180	Kaibab Limestone	Dry	11-2-66	......	......	......	N	.....	......	Cow Trap well; original depth 250 feet; caved in at 36 feet.
(A-16-13)19aaa	1930	977	8	6,100	Coconino Sandstone	775	7-22-66	......	......	......	S	.....	T4	Boundary well.
(A-16-14)3bba	......	800	8	5,660	do	506	5-5-66	......	......	......	S	.....	T4	Hotcake well.
(A-16-15)17abc	......	580	6	5,665	do	433	7-29-66	......	......	......	S	.....	T4	
24ab	6-64	705	8	5,625	do	505 R	6-26-64	......	......	......	S	.....	......	Navajo County Highway well.
(A-17-5)3dbd	1951	816	6	4,620	Supai Formation	746 R	7- -66	11 R	......	......	PS	.....	T4	Redcliff well.
25aab	1955	750	8	4,430	do	595	1-13-67	22 R	23 R	......	PS	.....	T4	Sky Mountain well.
(A-17-6)8bdb	1960	560	7	4,230	do	181	1-13-67	......	......	......	PS	.....	T4	Sedona No. 3 well.
18aba	......	257	6	4,220	do	......	......	......	......	......	D	.....	......	Original depth 177 feet.
18add1	1960	500	6	4,240	do	281 R	1960	......	......	......	PS	.....	T4	Sedona No. 2 well.
18add2	12-63	350	6	4,240	do	......	......	......	......	......	D	T3	......	
19bbc	......	......	5	4,195	do	298	1-13-67	......	......	......	......	.....	......	Doodlebug No. 1 well.
30abc	......	......	10	4,335	do	483	1-13-67	......	......	......	N	.....	......	Chapel Hill Estates No. 2 well.
30bba	......	......	6	4,295	do	440	1-13-67	......	......	......	N	.....	......	Chapel Hill Estates No. 1 well.

Table 1.--Records of selected wells in southern Coconino County—Continued

Location	Date completed (month, year)	Reported depth of well (feet)	Diameter of casing (inches)	Land-surface altitude (feet above mean sea level)	Water-bearing strata	Static water level		Bail or pump-test data			Use of water	Well log	Chemical analysis	Remarks
						Feet below land surface	Date measured	Rate (gpm)	Drawdown (feet)	Duration of test (hours)				
(A-17-6) 30bc	1951	......	8	4,250	Supai Formation	454	4-19-62	......	......	......	D	.....	T4	
(A-17-7) 4ddc	......	130	6	6,315	Alluvium	72 R	8- -61	1.5R	......	......	S	T3	.....	Plugged back from 256 feet.
(A-17-12)5cb	......	960	8	6,050	Coconino Sandstone	930 R	4-24-66	10 R	......	......	S	.....	.....	
(A-17-13)2baa	......	600	8	5,565	..... do	461	5-5-66	......	......	......	S	.....	T4	
(A-17-14)17add	1946	600	8	5,550	..... do	407	11-6-64	......	......	......	S	.....	T4	
23bcd	......	475	8	5,535	..... do	404	5-5-66	......	......	......	S	.....	T4	
(A-18-2)25bca	6-66	726	6	4,295	Supai Formation	630 R	7-21-66	17	30	1¼	S	.....	.....	
(A-18-4)25bcb	1950	1,120	8	4,755	Redwall Limestone and Supai(?) Formation.	760 R	6-2-67	10 R	......	......	D, S	.....	T4	Red Canyon Ranch well.
(A-18-5)27abb	1949	1,200	8	4,700	..... do	708	6-2-67	9 R	......	......	PS	.....	T4	
29adc	3-64	852	6	4,570	Supai Formation	676	5-31-67	9	......	......	N	T3	.....	
(A-18-6)21bba	1958	90	8	4,790	Alluvium(?)	15 R	1958	......	......	......	PS	.....	.....	Manzanita well.
21dc	11-66	266	8	4,740	Supai Formation	46 R	1-11-67	......	......	......	PS	.....	.....	Encinoso well.
(A-18-7)15ccb1	......	184	20	6,440	Alluvium	100 112	7-22-65 1-11-67	......	......	......	N	.....	.....	Northernaire No. 3 well.
15ccb2	......	205	14	6,438	..... do	98	7-22-65	450	......	......	Irr	T3	T4	Oakwood Irrigation Supply well.
15ccc	1958	200	10	6,435	..... do	118	1-11-67	69 R	22 R	4	PS	.....	T4	Northernaire No. 2 well.
16bca	......	19	54	6,470	..... do	6.3	1-11-67	......	......	......	D(?)	.....	.....	Dug well.
22bab	6-65	200	......	6,445	..... do	107	1-11-67	......	......	......	PS	T3	.....	Oakwood domestic well.
27cba	......	350	......	6,485	Volcanic rocks	....	....	......	......	......	PS	.....	.....	Yield insufficient in dry periods; Little Antelope Maintenance Camp No. 1 well.
27cbb	9-65	1,500	8	6,470	Supai Formation	1,279	9-7-65	26	58	24	PS	.....	T4	Little Antelope Maintenance Camp No. 2 well.
(A-18-9)6bb	5-61	300	8	7,250	Alluvium	....	....	......	......	......	N	T3	.....	Some water reported at 35 feet.
27cb	9-63	127	None	7,120	Volcanic rocks	Dry	9-17-63	......	......	......	N	T3	.....	Mormon Lake Ranger Station.
28bcb	7-63	39	8	7,110	Volcanic rocks and silt	....	....	29 R	......	......	PS	T3	.....	Tall Pines Estates well.
28bda	......	75	8	7,115	Volcanic rocks	20 R	....	12 R	......	......	PS	T3	.....	Mountain View Subdivision well.
29caa	......	65	8	7,125	..... do	30 R	12-1-66	......	......	......	D, PS	.....	.....	Mormon Lake Lodge well.
(A-18-12)13bbd	......	900	8	5,780	Coconino Sandstone	680	6-22-66	......	......	......	S	.....	.....	Wofolk well.
(A-18-12½)35dda	6-45	680	8	5,750	..... do	590 R	6-6-45	......	......	......	S	.....	T4	Dog Valley well.
(A-18-13)13ccd	......	475	8	5,355	..... do	374	5-6-66	......	......	......	S	.....	T4	
(A-18-14)9aac	......	450	8	5,205	..... do	292	5-11-66	......	......	......	S	.....	.....	

Table 1.--Records of selected wells in southern Coconino County—Continued

Location	Date completed (month, year)	Reported depth of well (feet)	Diameter of casing (inches)	Land-surface altitude (feet above mean sea level)	Water-bearing strata	Static water level		Bail or pump-test data			Use of water	Well log	Chemical analysis	Remarks
						Feet below land surface	Date measured	Rate (gpm)	Drawdown (feet)	Duration of test (hours)				
(A-18-14)13abd1	......	....	....	5,160	Coconino Sandstone	267	9- -63	....	......	......	S	.....	T4	
13abd2	1952	620	16	5,163	..... do	263	3-4-53	550	50	......	PS	.....	T4	Winslow No. 1.
13baa	1953	700	16	5,170	..... do	270 R	6-6-67	900 R	30 R	......	PS	.....	T4	Winslow No. 2.
13bad	12-62	1,100	20	5,180	Coconino Sandstone and Supai Formation.	298	12- -62	880 R	240 R	70	PS	T3	T4	Winslow No. 5.
13cab	6-54	900	16	5,208	Coconino Sandstone	309	11- -64	400 R	104 R	......	PS	.....	T4	Winslow No. 3.
13dbb	1954	1,000	16	5,204	Coconino Sandstone and Supai Formation.	305	11- -64	400 R	142 R	......	PS	.....	T4	Winslow No. 4.
36daa	1946	475	8	5,320	Coconino Sandstone	352	5-11-66	....	......	......	S	.....	T4	
(A-18-15)5abb	......	350	....	5,110	..... do	....	....	....	......	......	S	.....	T4	
30bcc	......	560	16	5,285	..... do	341	5-11-66	....	......	......	S	.....	T4	
(A-19-7)20bbb	1965	400	None	6,710	Alluvium and volcanic rocks.	Dry R	7-2-65	....	......	......	N	.....	.....	
23ad	1955	970	6	7,350	Coconino Sandstone	Dry R	8-28-55	....	......	......	N	T3	.....	
(A-19-9)17dd	7-67	1,700	10	6,925	Supai Formation	1,440 R	7-19-67	15 R	25 R	1½	PS	.....	.....	Pine Grove well; bail test at 1,590 feet.
22acc	7-65	207	None	7,105	Volcanic rocks	Dry R	7-7-65	....	......	......	N	T3	.....	Post Lake test hole.
(A-19-10)5dbc	8-63	1,125	8	6,500	Coconino Sandstone	....	....	....	......	......	N	.....	.....	Shoshone oil test.
24bdd	8-61	1,730	13	6,410	Supai Formation	1,294	6-16-66	....	......	......	N	.....	.....	Western Oil and Minerals Inc. No. 1 Federal oil test; plugged back from 3,020 feet.
24cdb	2-67	6,500	....	6,380	Supai Formation and Redwall(?) Limestone.	1,277	3-31-67	....	......	......	N	.....	.....	Steinberg-Babbitt oil test.
(A-19-12)29dc	1953	753	8	5,775	Coconino Sandstone	705	2-17-67	....	......	......	D, S	.....	.....	Buffalo Ranch well.
(A-19-12½)13bad	3-49	690	5	5,550	..... do	610 R	3- -49	....	......	......	PS	T3	T4	Museum well.
15cbb	12-50	760	8	5,525	..... do	531	6-22-66	18 R	......	......	S	.....	T4	Diablo well.
(A-19-13)5adc	6-54	570	6	5,320	..... do	475 R	6-26-54	....	......	......	S	T3	T4	Beacon well.
7bbb	......	....	5	5,405	..... do	532	11-1-66	....	......	......	S	.....	T4	Clonch well.
23abb	2-49	450	6	5,235	..... do	319	5-13-66	14 R	......	......	S	.....	T4	Ogilvie well.
29bab	3-38	603	8	5,425	..... do	520	11-1-66	12 R	0 R	......	D, S	T3	T4	Meteor Crater Ranch well.
(A-19-14)2aa	......	270	5	5,050	..... do	262	9-20-66	....	......	......	D, S	.....	T4	Triangle V Ranch well.
2ba	8-54	726	10	5,220	..... do	498	8-21-54	30	0	24	PS	.....	T4	Old Winslow Job Corps well.
4acc	......	410	....	5,080	..... do	356	5-11-66	....	......	......	PS	.....	T4	Hopi House well.
4bbb	8-66	600	8	5,035	..... do	310	8-18-66	105	0	28	PS	T3	T4	New Winslow Job Corps well.

Table 1. --Records of selected wells in southern Coconino County—Continued

Location	Date completed (month, year)	Reported depth of well (feet)	Diameter of casing (inches)	Land-surface altitude (feet above mean sea level)	Water-bearing strata	Static water level		Bail or pump-test data			Use of water	Well log	Chemical analysis	Remarks
						Feet below land surface	Date measured	Rate (gpm)	Drawdown (feet)	Duration of test (hours)				
(A-19-14)21a	......	....	8	5,050	Coconino Sandstone	313	5-11-66	....	......	....	S	.....	T4	
(A-19-15)27ac	......	280	6	4,950	..... do	164	3-3-53	....	......	....	N	.....	......	
28ad	......	620	6	4,950	..... do	166	11-20-64	....	......	....	N	.....	......	Specific conductance 1,410.
(A-19-16)6acb	......	185	6	4,830	..... do	46	4-30-65	....	......	....	D, Irr	.....	T4	
(A-20-6)2bbc	6-63	1,600	24	7,187	Coconino Sandstone and Supai Formation.	1,102	9-8-66	600	......	....	PS	.....	......	Woody Mountain No. 5.
(A-20-7)7acd	9-65	275	None	6,890	Alluvium and Kaibab Limestone.	Dry R	9-25-65	....	......	....	N	.....	......	
7adb	1959	995	8	6,900	Supai Formation and Coconino(?) Sandstone.	949	6-7-60	....	......	....	D	.....	......	
12bba	1960(?)	987	12	6,840	Coconino Sandstone	900	6-29-65	40	......	....	PS	.....	......	
12ddb	6-65	1,040	......	6,820	..... do	760	11-18-65	167	211	36	N	.....	......	Ponderosa No. 3 well.
20dad	4-66	103	None	6,820	Alluvium and Kaibab Limestone.	Dry	4-28-66	....	......	....	N	.....	......	
28bcc	1961	990	......	6,790	Coconino Sandstone	850 R	6- -61	....	......	....	PS	T3	......	Mountainaire well.
30bbc	8-65	1,075	12	6,675	Coconino Sandstone and Supai Formation.	623 R	8- -65	34	20	2	PS	T3	......	Bail tested at 730 feet.
(A-20-8)18bbb	1962	1,174	22	6,830	..... do	598	6-4-65	300	......	....	N	T3	T4	Lake Mary No. 1; plugged back from 1,287 feet.
18bcc	11-64	1,091	30	6,830	Coconino Sandstone	432	4-14-65	625	177	25	PS	.....	......	Lake Mary No. 2.
(A-20-9)22acb	......	1,465	......	6,655	Supai Formation	Dry R	1-3-57	....	......	....	N	.....	......	
(A-20-10)1aad	1946	935	6	5,900	Coconino Sandstone	919	2-15-67	....	......	....	D, S	.....	......	
26dba	11-63	3,596	5	6,250	Supai Formation	1,164	9-29-66	....	......	....	N	.....	......	Pickett oil test.
(A-20-11)7ad	7-40	950	8	5,920	Coconino Sandstone	910 R	11-24-64	....	......	....	D, S	T3	......	
12baa	6-62	3,624	9	5,724	..... do	....	....	....	......	....	S	.....	......	Roy Owen oil test.
(A-20-12)14bd	......	650	......	5,525	..... do	610 R	11-24-64	....	......	....	PS	.....	......	Two Guns T. P. well.
29ac	1939	684	8	5,625	..... do	590 R	2- -39	2 R	......	....	S	T3	......	Anderson Canyon well.
34cc	......	750	6	5,610	..... do	....	....	....	......	....	S	.....	......	
(A-20-12½)1ddd	......	....	8	5,275	..... do	480	5-12-66	....	......	....	S	.....	T4	
14dda	......	1,155	12	5,345	..... do	565	5-13-66	....	......	....	S	.....	T4	Sunshine oil test.
24ab	7-46	645	8	5,420	..... do	591	10-24-66	8 R	......	....	N	.....	......	
24cbb	6-45	640	8	5,405	..... do	574	10-21-66	14 R	......	....	PS	.....	T4	
(A-20-13)21da	......	350	......	5,100	..... do	300 R	11-25-65	....	......	....	D, S	.....	T4	

Table 1.--Records of selected wells in southern Coconino County—Continued

Location	Date completed (month, year)	Reported depth of well (feet)	Diameter of casing (inches)	Land-surface altitude (feet above mean sea level)	Water-bearing strata	Static water level		Bail or pump-test data			Use of water	Well log	Chemical analysis	Remarks
						Feet below land surface	Date measured	Rate (gpm)	Drawdown (feet)	Duration of test (hours)				
(A-20-13)35baa	1956	400	......	5,090	Coconino Sandstone	310 R	12-7-64	....	......	....	PS	.....	......	Specific conductance 810; Meteor City well.
35da	......	400	10	5,110	..... do	251	5-12-66	....	......	....	S	.....	T4	Dennison well.
(A-20-14)7b	......	200	......	4,910	..... do	....	....	....	......	....	S	.....	T4	Red Gap well.
31cc	......	300	......	5,025	..... do	240 R	5- -66	300 R	......	....	N	.....	......	
(A-21-2)3ba	......	116	7	7,050	Volcanic rocks	100	8-16-63	40	8.5	480	D	.....	T4	Lost Canyon Ranch No. 1.
(A-21-3)26bba	......	....	......	6,726	Alluvium	0	7-18-65	....	......	....	D, S	.....	......	Dug well.
(A-21-4)11aca	......	47	6	6,850	Kaibab Limestone	41	9-1-49	....	......	....	D	.....	......	Do.
(A-21-5)2abc1	11-26	122	12	7,128	Volcanic rocks and silt ...	21	4-21-43	....	......	....	PS	T3	T4	Bellemont-Santa Fe No. 1.
2abc2	1927	335	......	7,128	..... do	Dry R	1927	....	......	....	N	.....	......	Bellemont-Santa Fe No. 2; reportedly hit water at 50 feet but lost it in crevice at 230 feet.
2abc3	8-29	110	12	7,131	..... do	27	3-15-67	....	......	....	N	.....	......	Bellemont-Santa Fe No. 3.
2cc	1942	90	10	7,120	..... do	25 R	1942	50 R	......	....	N	.....	......	Navajo Army Depot construction well No. 6.
11cbc	1950	1,647	12	7,043	Supai Formation	1,273	8-28-50	....	......	....	PS, Ind	.....	T4	Navajo Army Depot well.
(A-21-6)25cda	10-65	170	None	7,060	Volcanic rocks	Dry R	10- -65	....	......	....	N	.....	......	
35bcc	10-57	1,602	24	7,130	Coconino Sandstone and Supai Formation.	1,213	11-19-58	400	......	....	PS	.....	......	Woody Mountain No. 3.
35cba	12-54	1,600	12	7,140	..... do	1,228	12-8-54	206	68	168	PS	.....	T4	Woody Mountain No. 1.
35ccb	7-56	1,746	16	7,167	..... do	1,247	11-19-58	....	......	....	PS	.....	......	Woody Mountain No. 2.
35ccc	11-57	1,540	24	7,166	..... do	1,083	11-19-58	460	......	....	PS	.....	T4	Woody Mountain No. 4.
(A-21-7)4adc	......	65	12	7,070	Volcanic rocks	8.0	1-4-67	....	......	....	D	.....	......	
5aab	10-64	120	6	7,110	Volcanic rocks and silt ...	34	10- -64	4 R	......	....	N	T3	......	Cheshire No. 10.
5aac	11-64	130	None	7,095	..... do	81	11- -64	1.5R	......	....	N	T3	......	Cheshire No. 11.
5acc	10-64	126	6	7,095	Volcanic rocks, silt, and sand.	21	10- -64	10 R	......	....	N	T3	......	Cheshire No. 9.
5baa	12-64	40	8	7,119	..... do	9.0	12-8-64	60	4	6	N	.....	......	Cheshire No. 1.
5bab	11-64	170	6	7,122	Volcanic rocks, silt, sand, and gravel.	40	11- -64	3 R	......	....	N	T3	......	Cheshire No. 12.
5bad	1960	26	36	7,110	..... do	9.0	11- -64	10 R	7 R	2	N	.....	......	Cheshire No. 2.
5dab	12-64	155	6	7,095	Volcanic rocks and silt ...	39	12- -64	25 R	......	....	N	T3	......	Cheshire No. 13.
16aaa	......	805	12	6,950	Volcanic rocks	67	6-16-44	....	......	....	....	.....	......	Kaibab Limestone and Coconino Sandstone dry.

Table 1 --Records of selected wells in southern Coconino County—Continued

Location	Date completed (month, year)	Reported depth of well (feet)	Diameter of casing (inches)	Land-surface altitude (feet above mean sea level)	Water-bearing strata	Static water level		Bail or pump-test data			Use of water	Well log	Chemical analysis	Remarks
						Feet below land surface	Date measured	Rate (gpm)	Drawdown (feet)	Duration of test (hours)				
(A-21-7)20bdb	.....	1,620	....	6,970	Coconino Sandstone and Supai Formation.	1,220	9-19-62	30 R	......	......	....	.....	.....	
21ccd	1961	1,200	....	6,900	..... do	Dry(?)	1961	....	......	......	N	T3	.....	
22aad	11-57	1,433	12	6,855	Supai Formation	1,273	6-25-56	40 R	......	......	N	.....	T4	Ponderosa No. 1 well.
22ada	10-64	1,450	12	6,865	..... do	1,234 R	10-10-64	7 R	......	......	N	.....	.....	Ponderosa No. 2 well.
26ab	......	297	8	6,791	Kaibab Limestone	70 R	4-22-61	1.5R	......	......	N	T3	.....	
32bbc	9-56	1,200	12	6,907	Coconino Sandstone and Supai Formation.	985	10-3-56	....	......	......	D, S	.....	T4	
(A-21-9)6bab	5-67	1,700	8	6,500	Supai Formation	1,302	5-1-67	26	150	5	PS	.....	.....	Mountain View Ranchos No. 1 well.
8aaa	......	1,410	....	6,380	..... do	1,280 R	12- -61	15 R	15 R	......	D, S	.....	.....	
10bbc	7-66	1,338	10	6,350	..... do	1,227	7-30-66	7 R	......	......	PS	T3	.....	2-Bar-3 well.
14acc	......	1,320	8	6.320	Coconino Sandstone and Supai Formation.	1,205	6-24-66	7.5	8.8	2	PS	.....	T4	Winona T P. well.
14ccb	1965	1,315	6	6,320	..... do	1,215 R	1965	....	......	......	D, S	T3	.....	
15dcb	1922	90	30	6,250	Alluvium	Dry	3-5-59	....	......	......	N	.....	.....	Water level 57 feet in June 1944.
(A-21-10)16bd	......	1,050	8	6,025	Coconino Sandstone	990 R	12-21-61	13 R	0 R	......	D, S	T3	.....	
(A-21-11)19bc	......	915	8	5,820	..... do	785 R	....	14 R	0 R	......	S	.....	.....	
24d	2-35	738	6	5,510	..... do	617	5-12-54	6	......	......	D, S	T3	T4	Tribal well 5M-122.
31cd	.....	1,000	.....	5,860	..... do	940 R	2-16-67	....	......	......	PS	.....	.....	Toonerville well.
(A-21-12)3cb	3-55	812	8	5,330	..... do	618	3-16-55	10	0	$\frac{3}{4}$	D, S	.....	T4	Tribal well 5K-317.
17bd	4-55	717	8	5,340	..... do	530	4-22-55	14	0	$1\frac{1}{4}$	D, S	.....	T4	Tribal well 5K-316.
(A-21-12½)14ac	1924	388	6	5,040	..... do	324	3-30-53	10	......	......	D, S	.....	T4	Tribal well 5M-94.
36bd	9-55	553	8	5,180	..... do	460	9-16-55	10	0	$\frac{3}{4}$	D, S	T3	.....	Tribal well 5T-320.
(A-21-13)4ba	.....	.....	6	4,795	Kaibab(?) Limestone and Coconino Sandstone	122	11-22-65	....	......	......	D, S	.....	T4	Tribal well 5T-506.
22ad	1924	253	6	4,800	Coconino Sandstone	140	1-22-53	10	......	......	D, S	T3	T4	Tribal well 5M-86.
35bc	1924	426	6	4,870	..... do	223	5-11-54	10	......	......	D, S	.....	T4	Tribal well 5M-88.
(A-21-14)9dd	10-53	540	12	4,810	Kaibab Limestone and Coconino Sandstone.	103	10-16-53	37	......	$\frac{1}{2}$	S	.....	T4	Tribal well 5K-313.
25cc	10-55	440	10	4,900	Coconino Sandstone	216	10-12-55	15	0	$\frac{1}{2}$	S	.....	T4	Tribal well 5T-319.
(A-22-2)27d	1929	1,020	......	6,800	..... do	Dry R	1929	....	......	......	N	T3	.....	Santa Fe-Williams No. 3.
29dab	1963	2,500	......	6,735	Supai Formation	Dry R	1963	....	......	......	N	.....	.....	
(A-22-3)10ab	......	2,340	......	6,957	..... do	Dry R	....	....	......	......	N	.....	.....	EPNG-Williams No. 1

Table 1 --Records of selected wells in southern Coconino County—Continued

Location	Date completed (month, year)	Reported depth of well (feet)	Diameter of casing (inches)	Land-surface altitude (feet above mean sea level)	Water-bearing strata	Static water level: Feet below land surface	Static water level: Date measured	Bail or pump-test data: Rate (gpm)	Bail or pump-test data: Draw-down (feet)	Bail or pump-test data: Duration of test (hours)	Use of water	Well log	Chemical analysis	Remarks
(A-22-3)26bca	12-65	522	None	6,925	Volcanic rocks	Dry R	12-2-65	......	......	......	N	T3	.....	Seep reported at base of volcanic rocks.
(A-22-4)8dac	....	2,570	......	7,240	Supai Formation	Dry R	....	......	......	......	N	.....	.....	EPNG-Williams No. 3.
26dc	1950	124	6	7,100	Volcanic rocks	102	8-15-50	6	3	......	....	T3	T4	
(A-22-5)16dbc	1966	480	6	7,470	..... do	402	1-4-67	29	......	......	D	.....	.....	Transwestern Station No. 2.
26ab	3-53	550	......	7,230	..... do	Dry R	3-1-53	......	......	......	N	.....	.....	EPNG-Williams No. 2.
26ad1	8-53	2,151	......	7,230	Supai Formation	2,010 R	8-3-53	20	......	......	N	.....	.....	EPNG-Williams No. 6.
26ad2	7-53	2,350	14	7,232	..... do	2,120 R	7-1-53	......	......	......	N	.....	.....	EPNG-Williams No. 5.
(A-22-6)23bcb	......	191	7	7,390	Volcanic rocks	150 R	....	1.2R	......	......	S	T3	.....	
23cdc	1961	112	6	7,320	..... do	90 R	1961	......	......	......	N	.....	.....	
23cdd	1962	160	6	7,325	..... do	100 R	1962	12 R	......	......	D	.....	.....	
23dba	......	185	6	7,350	..... do	65 R	....	1.5R	......	......	D	T3	.....	Plugged back from 276 feet.
23dca	1964	114	6	7,335	..... do	....	....	20 R	0 R	......	D	T3	.....	
25cac1	......	80	6	7,295	..... do	40 R	....	50 R	......	......	D	.....	.....	
25cac2	......	258	6	7,300	Volcanic rocks, silt, sand, and gravel.	170 R	....	1.2	......	......	D	T3	.....	
25cbd	10-63	260	6	7,295	Volcanic rocks, silt, and Moenkopi Formation.	169 R	10-18-63	15 R	......	......	D	T3	.....	
26aaa	1960	1,540	16	7,340	Volcanic rocks, silt, and gravel.	....	....	......	......	......	N	T3	.....	Cascading water at 131 feet; Coconino Sandstone and Supai Formation dry.
26daa	1-63	227	6	7,300	Alluvium and volcanic rocks.	....	....	5 R	......	......	S	T3	.....	
27cdd	1962	147	6	7,340	..... do	81 R	6-1-67	......	......	......	D	.....	.....	
(A-22-7)32cbb	7-60	202	6	7,175	Moenkopi(?) Formation	180 R	7- -60	4 R	20 R	......	D	T3	.....	
32ccc	12-61	128	6	7,155	Volcanic rocks	99 R	12-20-61	25 R	......	......	D	.....	.....	
32dda	10-57	200	6	7,180	Moenkopi Formation	....	....	3 R	......	......	D	T3	.....	
33cca	4-67	137	6	7,165	Volcanic rocks, silt, and sand.	80 R	4-11-67	5	.....	.....	N	T3	.....	Plugged back from 210 feet.
33cdd	......	100	12	7,150	..... do	40 R	......	23 R	35 R	1½	N	.....	.....	
34dc	7-60	370	7	7,225	Moenkopi Formation	175 R	7-22-60	15 R	......	.....	N	T3	.....	
(A-22-8)16dad	7-63	1,755	.....	6,745	Supai Formation	1,635 R	7- -63	11 R	15 R	3	N(?)	T3	.....	ATT-Flagstaff well.
24cc	1913	50	......	6,540	Alluvium	38	3-16-60	......	...	......	.....	.....	....	Dug well; dry on April 25, 1961.
32cda	1954	107	4	6,965	..... do	Dry R	1954	.....	...	.....	.....	...	.....	

Table 1 --Records of selected wells in southern Coconino County—Continued

Location	Date completed (month, year)	Reported depth of well (feet)	Diameter of casing (inches)	Land-surface altitude (feet above mean sea level)	Water-bearing strata	Static water level: Feet below land surface	Static water level: Date measured	Bail or pump-test data: Rate (gpm)	Bail or pump-test data: Drawdown (feet)	Bail or pump-test data: Duration of test (hours)	Use of water	Well log	Chemical analysis	Remarks
(A-22-8)33bda	1955(?)	410	8	6,770	Alluvium and Kaibab Limestone.	Dry R	1955	....	......	....	......	T3	.....	
35aac	11-57	1,550	8	6,550	Supai Formation	1,457	6-20-66	25	......	....	PS	.....	T4	
(A-22-9)29bac	3-59	1,450	6	6,550	..... do	1,390 R	2-11-59	....	......	....	D, S	T3	T4	
(A-22-10)3aca	......	2,400	12	5,710	..... do	1,138	10-5-66	....	......	....	S	.....	T4	Flagstaff Associates-Kellum No. 1 oil test.
(A-22-11)19cc	......	1,060	6	5,545	Coconino Sandstone	1,000 R	10- -54	10	......	....	S	.....	T4	
35bc	4-50	1,161	6	5,350	Coconino Sandstone and Supai Formation.	732	5-12-54	12	......	....	S	T3	T4	Tribal well 5M-103.
(A-22-12)11cb	10-52	687	8	4,990	Coconino Sandstone	335	10-20-52	200	15	14½	D. Ind	.....	T4	EPNG-Leupp No. 1.
15ab	1924	400	6	5,030	..... do	379	4-14-53	10	......	....	D. S	.....	T4	Tribal well 5M-108.
17bc	3-55	818	10	5,220	..... do	640	3-24-55	17	0	2	D, S	.....	T4	Tribal well 5K-315A.
25dd	10-52	632	10	5,030	..... do	379	2-27-53	40	0	¼	D, S	.....	T4	Tribal well 5K-309.
(A-22-12½)36cd	6-61	570	6	4,885	..... do	....	....	....	......	....	D, S	.....	T4	Tribal well 5T-507.
(A-22-13)7ca	5-65	162	......	4,710	Kaibab Limestone and Coconino(?) Sandstone.	75 R	6-4-65	15	0	2	D, S	.....	.....	Tribal well 5T-518.
18ad	......	200	6	4,710	..... do	85	1-22-53	....	......	....	PS	.....	T4	Sunrise T. P. well.
18bc	3-59	400	10	4,730	Kaibab(?) Limestone and Coconino Sandstone.	125 R	3-31-59	75	.9	1½	PS	.....	T4	New Leupp School, P. M. No. 2.
18cb	4-61	425	9	4,765	..... do	140	4-28-61	35	.5	3	D, S	.....	T4	Tribal well 5T-505.
18da	4-64	464	......	4,722	Kaibab Limestone and Coconino Sandstone.	101	4-6-64	123	5	2	PS	.....	T4	Tribal well 5T-510.
(A-23-5)27aac	7-65	760	......	7,661	Volcanic rocks	727 R	7-27-65	....	......	....	S	.....	.....	
(A-23-6)3cc	1935	22	30	7,875	Alluvium	8.8	7-12-49	....	......	....	N	.....	.....	Dug well.
6dca	......	10	48	7,911	.... do	4.2	6-2-67	....	......	....	S	.....	.....	Dug well; Mudersbach well.
(A-23-7)28ddd	9-66	245	10	9,780	..... do	132	10-10-66	300 R	4 R	24	N	.....	.....	Inner Basin No. 2.
33aab	9-66	357	4	9,835	..... do	159	10-10-66	....	.... ..	....	N	.....	.....	Inner Basin No. 1.
(A-23-8)16dcd1	3-63	604	......	6,925	Volcanic rocks, silt, sand, and gravel.	Dry R	3- -63	....	.... .	....	N	T3	.....	Sunset Crater Natl. Monument test hole.
16dcd2	3-65	2,200	8	6,925	Supai Formation	1,944	3-30-65	21	64	48	PS	.....	T4	Sunset Crater Natl. Monument well.
(A-23-10)1bb	.....	.. . ..	8	5,035	Coconino(?) Sandstone	740	10-19-54	6	......	....	S	.....	T4	Rhoton Spring well.
13dc	.....	. .. ...	8	5,200	. . do	859	10-19-54	6	......	....	S	.....	T4	
(A-23-11)28a	8-36	757	6	5,150	Coconino Sandstone	646	5-12-54	6	... .	5½	D, S	T3	T4	Tribal well 5M-104.
(A-23-12)17dc	1-55	122	8	4,850	... do	312	4-7-55	18	0	½	D, S	. . .	T4	Tribal well 5K-318

Table 1 --Records of selected wells in southern Coconino County—Continued

Location	Date completed (month, year)	Reported depth of well (feet)	Diameter of casing (inches)	Land-surface altitude (feet above mean sea level)	Water-bearing strata	Static water level		Bail or pump-test data			Use of water	Well log	Chemical analysis	Remarks
						Feet below land surface	Date measured	Rate (gpm)	Drawdown (feet)	Duration of test (hours)				
(A-23-12)26c	10-53	380	8	4,840	Coconino Sandstone	231	5-11-54	18	0	½	D,S	.....	T4	Tribal well 5K-314.
(A-24-1)16dcb	10-57	395	8	5,910	Kaibab Limestone and Toroweap Formation.	348	1-5-67	......	......	....	N	T3	......	
28ccd	10-60	1,140	None	5,980	Coconino Sandstone and Supai Formation.	Dry	10- -60	....	......	....	N	T3	......	Perrin No. 2 well.
(A-24-5)11cac	6-65	346	6	7,388	Volcanic rocks and sand ..	280	6- -65	60	13	24	N	T3	T4	
11cdb	8-55	292	6	7,386	Volcanic rocks	275	6- -65	100 R	......	720 R	S	T3	......	
(A-24-6)17bcd	6-66	302	......	7,453	..... do	266	6-26-66	....	......	....	S	.....	......	Antelope well.
(A-24-8)29ab	......	1,262	8	6,400	Coconino Sandstone	Dry R	1955	......	......	......	N	.....	......	
29ca	......	285	......	6,450	Volcanic rocks	Dry R	....	....	......	....	N	.....	......	
(A-25-1)22bd	1946	109	6	5,775	Alluvium	86	1-5-67	....	......	....	S	T3	......	
(A-25-5)21c	......	300	None	7,000	Volcanic rocks	Dry R	....	....	......	....	N	.....	......	Red Mountain well.
27ccb	1-61	320	None	6,895	Volcanic rocks and gravel.	Dry R	1- -61	....	......	....	N	T3	......	Upper Slate Mountain well.
(A-25-6)20acc	......	139	.....	6,968	..... do	86	10-3-66	....	......	....	N	.....	......	
20baa	3-61	60	6.5	6,815	Alluvium	30	10-3-66	50 R	......	....	N	T3	......	
20bbb	2-61	437	5	6,580	Chinle Formation (Shinarump Member) and Moenkopi(?) Formation.	407 R	2- -61	15 R	0 R		D,S	T3	......	
20bdd	1953(?)	112	6	6,965	Volcanic rocks	83	10-3-66	70 R	......	....	S	T3	T4	Plugged back from 142 feet.
29(?)	...	730	8	7,100	Chinle Formation (Petrified Forest Member)	.. ..	....	4 R	......	....	N	.....	......	
33bcb	. ...	450	. ...	7,195	Volcanic(?) rocks . .	374	10-3-66	10 R	......	....	N	.....	......	
(A-25-9)6cca	12-66	1,800	8	5,380	Supai Formation	1,583	1-23-67	17.5	5	24	PS	T3	T4	Citadel well.
(A-25-10)30bca	10-58	904	10	4,855	Coconino Sandstone	781	10-27-58	50	45	24	PS	.....	T4	Wupatki Natl. Monument Headquarters well.
(A-26-2)8aca	1964	375	None	5,870	Kaibab Limestone	Dry R	6-28-65	......	.. ...	....	N	....	.....	
11aad	1937	1,800	8	5,990	Supai Formation . .	1,600 R	. . . ..	1	200	.....	N	.....	......	
(A-26-8)1b . . .	2-57	1,550	..	5,200	Coconino Sandstone and Supai Formation	1,475 R	2-23-57	15 R	.. ..	......	D,S	T3	T4	Spider Web headquarters well.
36bc . . .	1925(?)	1,662	8	5,350	Supai Formation . .	1,550 R	1954	..	......	... ..	N	. .	. . . .	
(A-26-9)15a .	. . . .	1,250	6	5,080	. do	1,152 R	.....	18 R	.....	2	S	T3	.. . .	Bar Doney well
33dac	1952	1,410	8	5,345	. do . . .	1,343	10-22-54	15 R	0 R	48	S	T3		

Table 1.--Records of selected wells in southern Coconino County—Continued

Location	Date completed (month, year)	Reported depth of well (feet)	Diameter of casing (inches)	Land-surface altitude (feet above mean sea level)	Water-bearing strata	Static water level: Feet below land surface	Static water level: Date measured	Bail or pump-test data: Rate (gpm)	Bail or pump-test data: Drawdown (feet)	Bail or pump-test data: Duration of test (hours)	Use of water	Well log	Chemical analysis	Remarks
(A-26-10)9cda	......	......	6	4,250	Coconino Sandstone	259	11-10-66	......	......	......	S	.....	T4	River well.
31ca	1950	1,009	3	5,085	..... do	927	10-22-54	13 R	0 R	72	S	.....	T4	
(A-27-1)29c	11-46	1,470	.....	5,550	Hermit Shale	......	......	......	......	......	N	T3	......	Seep reported at 1,285 feet.
(A-27-4)13bbb	......	......	12	6,450	Coconino Sandstone and Supai(?) Formation.	Dry(?)	8-12-66	......	......	......	N	.....	......	
23dcc	......	2,250	.....	6,415	Supai Formation	Dry R	1- -66	......	......	......	N	.....	......	
(A-27-7)23bbc	11-51	300	.....	5,390	Alluvium and volcanic rocks.	Dry	11- -51	......	......	......	N	.....	......	Tribal well 3T-314.
23cdb	12-51	133	......	5,395	..... do	Dry	12- -51	......	......	......	N	.....	......	Tribal well 3T-314A.
(A-27-9)6dc1	9-55	1,408	8	5,030	Supai Formation	1,250	9-30-55	6 R	......	......	PS	.....	T4	Gray Mountain T. P. No. 1 well.
6dc2	1963(?)	1,500	8	5,030	..... do	1,308 R	5-12-66	20 R	......	......	PS	.....	T4	Gray Mountain T. P. No. 2 well.
7abb	1958	1,613	.....	5,040	..... do	......	......	25 R	......	......	PS	.....	T4	
7baa	3-67	1,450	8	5,040	..... do	1,150 R	3-10-67	8 R	......	......	PS	.....	......	Pickens-Myers well.
11ddd	......	......	......	4,590	Coconino Sandstone	706	11-10-66	7 R	......	......	S	.....	T4	Maize Wash well.
15ccc	4-48	2,165	12	5,100	Supai Formation	......	......	......	......	......	S	.....	......	Barron-Steele oil test.
21aaa	2-49	3,624	12	5,096	..... do	1,309	10-5-66	......	......	......	N	.....	......	Lockhart-Babbitt oil test.
(A-27-10)6abc	8-34	8	60	4,320	Chinle Formation (Shinarump Member).	4.0	11-10-66	......	......	......	D, S	.....	T4	Dug well.
(A-28-8)36bac	6-58	1,320	8	4,915	Coconino Sandstone	1,146	3-24-64	15 R	120 R	1½	D, S	.....	T4	Tribal well 3T-341.
(A-28-9)35bac	4-55	828	6	4,410	Kaibab Limestone	641	3-21-55	14	0	2	S	T3	T4	Tribal well 3K-331.
(A-29-1)29b	.....	1,275	.....	5,760	Coconino Sandstone	......	......	......	......	......	N	T3	......	Anita No. 1 well.
29dc	4-58	1,130	.....	5,775	Hermit(?) Shale	1,020 R	4- -58	.5	......	......	N	T3	......	Anita No. 2 well.
(A-29-2)16	1904	514	.....	6,450	Toroweap(?) Formation	500 R	1904	......	......	......	N	.....	......	Anita Copper Co. shaft.
(A-29-6)5dbc	......	1,440	8	6,180	Coconino Sandstone and Supai Formation	Dry	6-6-67	......	......	......	N	.....	......	77-Bar Ranch well.
(A-29-9)22dca	3-51	1,012	10	4,230	Kaibab Limestone and Coconino Sandstone.	600	3- -51	17	......	......	N	.....	T4	Cameron test No. 2.
(A-30-2)17	1930(?)	1,009	.....	6,425	Coconino Sandstone	Dry R	......	......	......	......	N	T3	......	Santa Fe-Anita well.
24a	......	623	.....	6,600	Toroweap Formation	550 R	10-17-66	1.5	......	......	N	...	......	Thurston No. 1 well; plugged back from 735 feet.
24bcb	9-66	730	10	6,550	..... do	542	10-17-66	5	......	......	N	T3	......	Thurston No. 3 well.
25b	......	[illegible]		6,650	..... do	......	......	5	......	......	N	T3	......	McAfee-Meeks No. 2 well
[illegible]	11-61	[illegible]	[illegible]	[illegible]	[illegible]	550 R	[illegible]-1-64	4.5	[illegible]	2	PS	T3	T4	McAfee-Meeks No. 1 well. plugged [illegible] from 1,400 feet

Table 1 --Records of selected wells in southern Coconino County—Continued

Location	Date completed (month, year)	Reported depth of well (feet)	Diameter of casing (inches)	Land-surface altitude (feet above mean sea level)	Water-bearing strata	Static water level		Bail or pump-test data			Use of water	Well log	Chemical analysis	Remarks
						Feet below land surface	Date measured	Rate (gpm)	Drawdown (feet)	Duration of test (hours)				
(A-31-2)33abb	....	....	18	6,675	Kaibab Limestone	14	12-9-64	...	......	......	N	.....	.....	Rowes well; dug well.
(B-21-2)3ddd	1900	1,025	8	5,125	Volcanic(?) rocks	Dry R	1900	......	......	......	N	.....	.....	Reportedly volcanic rocks from 0 to 1,025 feet.
(B-21-3)11cab	....	1,000	......	5,035	Martin(?) Limestone and Muav(?) Limestone.	Dry R	2-7-66	......	......	......	N	.....	.....	
15dcc	......	1,300	......	5,015	..... do	Dry R	2-7-66	......	......	......	N	.....	.....	
(B-22-1)30ada	10-31	2,624	......	5,530	Redwall(?) Limestone and Martin Limestone.	2,060 R	10-28-31	5	0	......	N	.....	.....	Santa Fe-Ash Fork test.
(B-22-2)9dcc	....	45	36	5,200	Alluvium	9.2	4-20-67	42 R	......	72 R	N	.....	.....	Dug well.
35	1941(?)	1,123	10	5,225	Redwall(?) Limestone and Martin(?) Limestone.	Dry R	1941	......	......	......	N	.....	.....	
36abb	....	48	36	5,320	Alluvium and volcanic rocks.	47	12-2-66	......	......	......	N	.....	.....	Do.
(B-22-4)18	....	2,300	......	5,700	Muav(?) Limestone	Dry R	5- -66	......	......	......	N	.....	.....	
36aab	....	1,300	......	5,325	Redwall Limestone and Martin(?) Limestone.	Dry R	5- -66	......	......	......	N	.....	.....	
(B-23-6)36	5-01	229	......	5,250	Volcanic(?) rocks	Dry R	6- -01	......	......	......	N	.....	.....	Santa Fe-Seligman No. 1.
36	8-01	302	......	5,250	..... do	Dry R	8- -01	......	......	......	N	.....	.....	Santa Fe-Seligman No. 2.
36	1902	1,403	......	5,250	Redwall(?) Limestone	Dry R	1902	......	......	......	N	.....	.....	Santa Fe-Seligman No. 3.
(B-23-7)10cdd	5-64	850	6	5,152	Redwall Limestone and Martin(?) Limestone.	627 R	3-20-64	5	......	......	D	.....	T4	ATT-Seligman well.
(B-24-8)17dc1	3-24	1,788	16	5,180	Muav Limestone and Tapeats Sandstone.	802 R	3-17-24	75 R	......	24	D, S	T3	.....	Santa Fe-Pica No. 3.
17dc2	7-39	1,750	......	5,180	..... do	824 R	7-15-39	146 R	......	24	D, S	.....	.....	Santa Fe-Pica No. 5.
17dd1	5-04	1,546	10	5,180	..... do	780 R	5-10-04	28 R	......	24	N	.....	.....	Santa Fe-Pica No. 1.
17dd2	3-11	1,634	12	5,180	..... do	800 R	3- -11	35 R	......	24	S	.....	.....	Santa Fe-Pica No. 2.
17dd3	1931(?)	1,422	......	5,180	..... do	....	....	......	......	......	N	.....	.....	Santa Fe-Pica No. 4; tools stuck in hole at 860 feet.
(B-25-3)3cc	6-62	140	......	5,950	Volcanic rocks	80 R	1-5-67	40 R	......	......	D, S	T3	.....	Espee No. 3 well.
(B-25-8)34aa	7-58	1,943	.....	5,250	Muav(?) Limestone and Tapeats Sandstone.	1,185 R	4-19-58	......	......	......	N	.....	.....	Ray Terry oil test.
(B-25-9)26(?)	2-60	1,700	5	5,500	Muav Limestone	1,385 R	2- -60	10 R	......	......	N	.....	.....	
(B-25-10)10adc	1964	82	......	5,300	Redwall Limestone	Dry R	1964	......	......	......	N	T3	.....	
(B-26-3)19b	1962	354	......	6,015	Volcanic rocks, silt, sand, and gravel.	Dry R	1962	......	......	......	N	T3	.....	Espee No. 1; seeps reported at 122 feet and 186 feet.

Table 1 --Records of selected wells in southern Coconino County—Continued

Location	Date completed (month, year)	Reported depth of well (feet)	Diameter of casing (inches)	Land-surface altitude (feet above mean sea level)	Water-bearing strata	Static water level		Bail or pump-test data			Use of water	Well log	Chemical analysis	Remarks
						Feet below land surface	Date measured	Rate (gpm)	Drawdown (feet)	Duration of test (hours)				
(B-26-3)20bd	1962	98	6	6,025	Volcanic rocks	52	1-5-67	....	......	......	N	.....	.....	Espee No. 2 well.
(B-27-1)3	......	....	8	5,675	Coconino(?) Sandstone	1,400	5-4-58	....	......	......	N	.....	.....	
(B-27-6)1adc	......	128	10	5,925	Alluvium	72	5-3-66	73	8	24	S	.....	T4	Rose well.
(B-27-7)28ba	......	....	8	5,870	Alluvium(?)	422	5-3-66	....	......	......	N	.....	.....	
(B-28-1)35ac	1952	3,544	13	6,005	Supai(?) Formation	....	....	....	......	......	N	.....	.....	Sinclair-Santa Fe-Pacific No. 1 oil test.
(B-28-3)12	8-62	1,400	......	5,525	Coconino Sandstone	Dry R	8- -62	....	......	......	N	T3	.....	Seep reported at about 1,140 feet.
(B-28-7)31c	1964	150	14	6,030	Alluvium	56 R	4- -64	30 R	90 R	6	S	T3	T4	Frazier Well No. 2.
(B-28-8)24daa	......	....	6	6,200	..... do	125	1-29-65	....	......	......	D, S	.....	T4	Upper Frazier Well.
25ddd	1932	....	6	6,100	..... do	74	6-3-66	....	......	......	N	.....	.....	Frazier Well School well.
27d	......	....	48	6,225	Alluvium(?)	47	6-3-66	....	......	......	S	.....	.....	
(B-29-1)12dbd	5-58	1,080	8	5,675	Coconino Sandstone	959	10-17-66	2	......	......	S	T3	T4	Anita No. 3 well.
(B-30-1)28aaa1	9-42	990	8	5,715	..... do	....	....	....	......	......	N	T3	.....	Tools reportedly lost in hole.
28aaa2	1943	1,020	8	5,725	..... do	938	10-14-66	....	......	......	D, S	.....	T4	
28baa	9-60	1,051	......	5,680	..... do	905 R	9- -60	5 R	......	......	N	T3	.....	

Table 2. --Records of selected springs in southern Coconino County

Location: See p. 3 for description of well-numbering and location system.
Range of discharge measurements: E, estimated; M, measured; R, reported.

Chemical analysis: T4, chemical analysis included in table 4.

Location	Land-surface altitude (feet above mean sea level)	Source rock	Range of discharge measurements (gpm)	Chemical analysis	Remarks
(A-11-14)35d	6,800	Supai Formation	1,290 M	....	
(A-12-7)14	4,320	Naco Formation	18,600 M	T4	Fossil Springs.
(A-12-12)33bac	6,500	Supai Formation	900 M	T4	Tonto Spring.
(A-14-8)32aa	5,080	Coconino Sandstone	1,000 E	T4	Buckhorn Spring.
(A-15-7)14acc	4,995	..... do	1,350 E	T4	Wet Beaver Creek Springs; head of perennial flow in Wet Beaver Creek.
(A-17-3)5db	3,600	Redwall Limestone	2,275-2,700 M	T4	Summers Spring.
(A-31-2)7	3,750	Muav Limestone	210 M	T4	Hermit Springs.
13abb	3,740	..... do	300 R	T4	Indian Gardens Spring.
(A-32-7)31b	3,165	..... do	41,070-43,490 M	T4	Blue Spring.
(A-33-6)33b	....	..... do	97,430-100,130 M	T4	Composite of all spring flow from Blue Spring to river mile 3.1.
(B-27-9)16d	3,800	..... do	>300 M	T4	Diamond Spring.
(B-33-4)26	3,250	Pennsylvanian limestone unit	28,690-29,900 M	T4	Havasu Spring.
(B-33-7)30(?)	1,700	Muav Limestone	2,700-3,600 E	T4	Warm Spring.

Table 3. --Modified drillers' logs of selected wells in southern Coconino County

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
(A-12-13½)1bbd					
QUATERNARY:			PERMIAN:		
			Coconino Sandstone:		
Alluvium:			Sandstone, light-cream, Coconino, broken	385	400
Soil	15	15	Coconino, pink and red; water at 770	412	812
(A-13-7)14hab					
QUATERNARY:			Sandstone, dark-gray	50	315
Alluvium:			Sandstone, light-gray	30	345
Rocky top soil	4	4	Sandstone, dark-gray	90	435
Clay and boulders	24	28	Basalt, black	27	462
QUATERNARY AND TERTIARY:			Sandstone, dark-gray	20	482
Volcanic rocks, sand, and gravel:			Sandstone, red; quite a bit of lime	38	520
Malpais, black, solid	17	45	Sand, gray and red	73	593
Volcanic ash, red	7	52	Basalt, black	60	653
Malpais, broken	60	112	Sandstone, red	3	656
Malpais, black, solid	38	150	Basalt, black	9	665
Gray sandstone and quartz	62	212	Sandstone, red	18	683
Sandstone, red	18	230	Sandstone, reddish-gray	10	693
Sandstone, gray	12	242	Basalt, black	41	734
Basalt, black	8	250	Sandstone, red	29	763
Sandstone, red	15	265	Basalt, black	37	800
(A-13-10)25caa					
QUATERNARY:			Sandstone, broken; some moisture	6	368
Alluvium:					
Mud	94	94	Sandstone, uniform; slight moisture noted in cuttings	82	450
PERMIAN:					
Kaibab Limestone:			Sandstone, broken, quite soft; large quantity of water at 461 feet	11	461
Limestone, decomposed; slight amount of moisture	17	111	Sandstone, broken; increased water	19	480
Limestone, decomposed; broken area from 135 to 146 feet	36	147	Sandstone, hard	38	518
Coconino Sandstone:			Sandstone, hard, very little change	97	615
Sandstone, very little change	179	326	Sandstone, hard, no change	11	626
Sandstone, quite uniform	36	362	Soft and broken formation	26	652
			Sandstone, medium-hard	74	726
(A-14-11)9adc					
QUATERNARY:			Lime, white, hard	49	197
Alluvium:			Lime, cream-colored, soft	7	204
Soil	4	4	Lime, dark-yellow, hard	6	210
PERMIAN:			Limestone, white	98	308
Kaibab Limestone:			Limestone, tan	78	386
Lime, gray, hard; bad start	19	23	Coconino Sandstone:		
Lime, cream-colored, hard	28	51	Coconino, white	50	436
Lime, light-pink, hard	19	70	Coconino, pink	12	448
Lime, white, hard	12	82	Coconino, tan; hit water at 530 feet	115	563
Lime, white, broken	15	97	Coconino, cream	35	598
Lime, buff-colored, medium-hard	10	107	Coconino, light-brown	42	640
Lime, brown, hard	26	133	Coconino, light-gray	30	670
Lime, dark-gray, broken, cavey	15	148			
(A-14-11)9dca					
QUATERNARY:			Clay, red	30	145
Alluvium:			Limestone	250	395
Lime boulders and clay	8	8	Coconino Sandstone:		
PERMIAN:			Coconino, hard	115	510
Kaibab Limestone:			Coconino with a little water	30	540
Lime, requires blasting to keep straight	107	115	Coconino with a large amount of water	125	665
(A-14-11)12bcd					
PERMIAN:			Limestone, red	8	71
Kaibab Limestone:			Limestone, buff	13	84
Limestone, broken	4	4	Limestone, red	8	92
Limestone, buff, hard	29	33	Limestone, buff, sandy, small seep of water	21	113
Limestone, pink, sandy	5	38	Limestone, gray, sandy	35	148
Limestone, white, sandy, in part very hard	25	63			

Table 3.--Modified drillers' logs of selected wells in southern Coconino County—Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
(A-14-11)12bcd—Continued					
Limestone, hard, white	30	178	Sandstone, gray	33	365
Limestone, buff, sandy	12	190	Sandstone, buff	20	385
Limestone, gray, sandy	52	242	Sandstone, white; water-bearing stratum, water rose to 383 feet	8	393
Limestone, buff	8	250	Sandstone, white, coarse, hard	55	448
Limestone, gray	18	268	Sandstone, gray, hard	9	457
Limestone, yellow, sandy	20	288	Sandstone, white; water-bearing stratum, water rose to 372 feet	4	461
Coconino Sandstone:			Sandstone, buff	16	477
Sandstone, white	3	291			
Sandstone, hard, yellow	16	307			
Sandstone, white	25	332			
(A-16-9)28cbc					
QUATERNARY:			Cinders, soft, water	14	32
Alluvium:			Clay	6	38
Dirt	3	3	Cinders, water	28	66
TERTIARY:			Clay, dry	40	106
Volcanic rocks and silt:			Malpais, boulders, hard cinders, won't hold water	29	135
Malpais and cinder cap	15	18			
(A-17-6)18add2					
QUATERNARY:			Sandstone, white	11	205
Alluvium:			Sandstone, pink	27	232
Top soil	2	2	Sandstone, red	11	243
PERMIAN AND PENNSYLVANIAN:			Sandstone, pink	7	250
Supai Formation:			Sandstone, purple	22	272
Sandstone, red	58	60	Sandstone, red	8	280
Crevice	5	65	Sandstone, gray	15	295
Sandstone, red	55	120	Sandstone, gray, soft	37	332
Sandstone, red, with quartz	13	133	Sandstone, red	18	350
Sandstone, red, hard	61	194			
(A-17-7)4ddc					
QUATERNARY AND TERTIARY:			Cinders, red, hard in streaks	22	197
Alluvium:			Basalt, hard, broken	15	212
Clay, brown; 1½ gpm at 72 feet	140	140	Basalt, hard	39	251
Lava sand	3	143	Cinders, broken	2	253
TERTIARY:			Basalt, broken	3	256
Volcanic rocks:					
Basalt, hard, broken	32	175			
(A-18-5)29adc					
QUATERNARY:			Shale, red	10	321
Alluvium:			Sandstone, brown, hard	137	458
Boulders, sand, and gravel	21	21	Shale, red, caving	19	477
PERMIAN AND PENNSYLVANIAN:			Lime, white and gray	71	548
Supai Formation:			Lime, red, sandy	44	592
Sandstone, red	19	40	Lime, white	51	643
Shale, red	4	44	Lime, red and brown; first water at 680 feet	37	680
Sandstone, red, hard	75	119	Shale, brown	2	682
Shale and sandstone, red, medium-hard	9	128	Lime, gray	112	794
Sandstone, brown, hard	54	182	Sandstone, gray, very hard	7	801
Shale, red; thin layers of sandstone	11	193	Shale, red	7	808
Sandstone, red, hard	26	219	Lime, gray and brown	8	816
Sandstone, gray, hard	55	274	Layers of brown shale and lime	9	825
Sandstone, dark-red	17	291	Conglomerate, lime, shale, sand, and clay; large stream of water	10	835
Light-gray sandstone, pink shale, and hard limestone	14	305	Lime, brown, gray, and red	17	852
Sandstone, red	6	311			
(A-18-7)15ccb2					
QUATERNARY AND TERTIARY(?):			Sand, gravel, and cinders	120	205
Alluvium:					
Clay, heavy	85	85			

Table 3. --Modified drillers' logs of selected wells in southern Coconino County—Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
(A-18-7)22bab					
QUATERNARY AND TERTIARY(?):			Sand, gravel, and cinders	75	200
Alluvium:					
Clay, heavy	125	125			
(A-18-9)6bb					
QUATERNARY:			at 35 feet	35	40
Alluvium:			Clay, white, soft	155	195
Soil	5	5	Conglomerate, sandy, hard	60	255
Clay, white, soft; small stream of water			Clay, light-brown	45	300
(A-18-9)27cb					
QUATERNARY:			Conglomerated cinders	10	82
Alluvium:			Lava, hard	6	88
Adobe topsoil	3	3	Lava, soft, porous	3	91
Clay, brown	12	15	Hard lava and layers of brown clay	25	116
Clay, yellow	30	45	Lava, very hard	7	123
Clay, brown	19	64	Cinders, soft, cemented	3	126
TERTIARY:			Lava, very hard	1	127
Volcanic rocks:					
Dark cinders and red clay	8	72			
(A-18-9)28bcb					
QUATERNARY:			TERTIARY:		
Alluvium:			Volcanic rocks and silt:		
Soil and clay, black	4	4	Lava, very hard	11	27
Clay, light color to yellow; water, about			Cinders, some clay, water, about 29 gpm	10	37
5 gpm	12	16	Lava, blue, very hard	2	39
(A-18-9)28bda					
QUATERNARY:			TERTIARY:		
Alluvium:			Volcanic rocks:		
Soil	4	4	Lava, streaked, hard and scoriaceous;		
Clay, yellow; first water at 20 feet	16	20	water increased with depth	19	75
Clay, blue-green	36	56			
(A-18-14)13bad					
TRIASSIC:			Sandstone, brown	3	653
Moenkopi Formation:			Sandstone, gray	234	887
Sandstone, red, Moenkopi	20	20	Sandstone, light-brown	18	905
Sandstone, yellow	5	25	Sandstone, gray	19	924
PERMIAN:			Sandstone, light-brown	31	955
Kaibab Limestone:			PERMIAN AND PENNSYLVANIAN:		
Limestone, yellow	15	40	Supai Formation:		
Limestone, gray, sandy	130	170	Silty sandstone, brown, fine	65	1,020
Coconino Sandstone:			Sandstone, reddish-brown, fine	55	1,075
Sandstone, gray; first water at 300 feet	480	650	Silty sandstone, reddish-brown, fine	25	1,100
(A-19-7)23ad					
QUATERNARY:			Clay, muddy	55	605
Alluvium:			PERMIAN:		
Soil	14	14	Kaibab Limestone:		
TERTIARY:			Tufa and lime	95	700
Volcanic rocks:			Toroweap Formation and Coconino Sandstone		
Malpais, solid	51	65	undifferentiated:		
Cinders and malpais	360	425	Sandstone	270	970
Silt and sand:					
Clay and sand	125	550			

Table 3. --Modified drillers' logs of selected wells in southern Coconino County — Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
(A-19-9)22acc					
QUATERNARY:			Malpais, broken	130	180
Alluvium:			TRIASSIC:		
Clay, brown, heavy	15	15	Moenkopi Formation:		
Sand, gravel, and a few cinders	20	35	Moenkopi	27	207
TERTIARY:					
Volcanic rocks:					
Malpais	15	50			
(A-19-12½)13bad					
QUATERNARY:			Shale, red and blue	3	51
Alluvium:			Sandstone, red	6	57
Broken Kaibab, Coconino, and Moenkopi mixed; throwback from blowout	30	30	PERMIAN:		
TRIASSIC:			Kaibab Limestone:		
Moenkopi Formation:			Limestone, broken badly, Kaibab	281	338
Shale, red and blue mottled, some gypsum streaks, Moenkopi	7	37	Coconino Sandstone:		
Limestone, sandy, red	11	48	Sandstone, broken badly, Coconino, water strata at 637-643 and 676-683	352	690
(A-19-13)5adc					
TRIASSIC:			Coconino Sandstone:		
Moenkopi Formation:			Sandstone, dark-yellow	30	280
Shale, red	10	10	Sandstone, light-yellow	120	400
Sandstone, red	30	40	Sandstone, buff-colored	50	450
PERMIAN:			Sandstone, light-gray, small amount of water at 475 feet	100	550
Kaibab Limestone:			Sandstone, white, more water	20	570
Lime, yellow	160	200			
Lime, dark-yellow	50	250			
(A-19-13)29bab					
QUATERNARY:			Coconino Sandstone:		
Alluvium:			Sandstone, Coconino	38	230
Surface soil	1	1	Sandstone, yellow, Coconino, loses water	20	250
PERMIAN:			Sandstone, buff, hard	277	527
Kaibab Limestone:			Sandstone, white, Coconino, 4 gpm	6	533
Decomposed limestone, Kaibab	2	3	Sandstone, buff, Coconino	23	556
Limestone, buff, broken, Kaibab	29	32	Sandstone, white, Coconino, 12 gpm	12	568
Limestone, buff, solid, Kaibab	39	71	Sandstone, buff	35	603
Limestone, buff and white, Kaibab	121	192			
(A-19-14)4bbb					
QUATERNARY:			Limestone; hit crack and lost water at 290-295 feet	15	295
Alluvium:			Coconino Sandstone:		
Sandy soil	10	10	Sandstone, yellow, water	15	310
TRIASSIC:			Sandstone, light-yellow	60	370
Moenkopi Formation:			Sandstone, light-gray	100	470
Shale, red, Moenkopi	130	140	Sandstone, light-gray and yellow	5	475
PERMIAN:			Sandstone, light-gray, loose running sand from 485-490 feet	20	495
Kaibab Limestone:			Sandstone, light-gray	105	600
Limestone, yellow	45	185			
Limestone, yellow and gray	95	280			
(A-20-7)28bcc					
QUATERNARY AND TERTIARY(?):			Toroweap Formation and Coconino Sandstone undifferentiated:		
Alluvium:			Sandstone, solid	320	725
Topsoil	3	3	Sandstone, broken; lost previous water	30	755
Conglomerate	22	25	Sandstone, solid	60	815
Clay	40	65	Sand shells; lost water through layer	25	840
Sandstone	15	80	Sandstone; water stands to 850 feet	105	945
Clay	65	145	Sandstone	35	980
PERMIAN:			Sandstone, deep red	10	990
Kaibab Limestone:					
Limestone; 3 gpm at 275 in broken limestone	260	405			

Table 3. --Modified drillers' logs of selected wells in southern Coconino County—Continued

	Thickness (feet)	Depth (feet)
(A-20-7)30bbc		
QUATERNARY:		
Alluvium:		
Soil and fill	20	20
PERMIAN:		
Kaibab Limestone:		
Limestone, gray	60	80
Limestone, yellow	10	90
Limestone, light-yellow	30	120
Limestone, pink	10	130
Limestone, gray and pink	120	250
Toroweap Formation and Coconino Sandstone undifferentiated:		
Sandstone, brown, Coconino	80	330
Sandstone, reddish-brown, Coconino	270	600
Sandstone, reddish-brown, with streaks of loose sand and rocks; water from 823 to 720 feet	120	720
Sandstone, reddish-brown, Coconino	305	1,025
Sandstone, reddish-brown, loose and caving, Coconino	40	1,065
PERMIAN AND PENNSYLVANIAN:		
Supai Formation:		
Supai Formation, reddish and silty	10	1,075
(A-20-8)18bbb		
QUATERNARY:		
Alluvium:		
Clay, boulders	7	7
Volcanic rocks:		
Volcanic lava	104	111
TERTIARY:		
Silt and sand:		
Red clay and cinders	10	121
PERMIAN:		
Kaibab Limestone:		
Lime, Kaibab	19	140
Lime, very hard, some clay streaks	35	175
Lime, soft, Kaibab	28	203
Lime, Kaibab	93	296
Kaibab	67	363
Coconino Sandstone:		
Lime, sandstone, mixed	47	410
Lime, Coconino, very hard streaks	14	424
Kaibab, Coconino, hard	51	475
Coconino	75	550
Sand, brown, cracks	20	570
Sand, brown, Coconino	40	610
Sand, red, water showing; water raised to 582 feet	40	650
Coconino, cracks, sand trouble	55	705
Coconino, white; loose sand at 750 feet	75	780
Sand, white, Coconino; loose sand	74	854
Coconino, pink	11	865
Coconino, cracks	10	875
Coconino, lots of sand	125	1,000
Sand, Coconino	75	1,075
Coconino and clay	10	1,085
PERMIAN AND PENNSYLVANIAN:		
Supai Formation:		
Clay, Coconino and Supai	52	1,137
Clay, Supai	25	1,162
Clay, Supai; caving badly	12	1,174
Supai	113	1,287
(A-20-11)7ad		
QUATERNARY:		
Alluvium:		
Surface soil	6	6
Lime boulders	1½	7½
Shale, red, Moenkopi	1½	9
PERMIAN:		
Kaibab Limestone:		
Limestone, buff, top Kaibab	39	48
Limestone, gray	15	63
Limestone, buff	24	87
Limestone, white	36	123
Limestone, buff, base Kaibab	142	265
Coconino Sandstone:		
Sandstone, buff, top Coconino	42	307
Sandstone, white	55	362
Sandstone, buff	31	393
Sandstone, white	68	461
Sandstone, buff	209	670
Sandstone, white	15	685
Sandstone, buff	75	760
Sandstone, yellow	30	790
Sandstone, buff	101	891
Sandstone, yields water, water rises to 852-foot level	59	950
(A-20-12)29ac		
PERMIAN:		
Kaibab Limestone:		
Limestone, buff	63	63
Limestone, white	45	108
Limestone, buff	188	296
Limestone, white	17	313
Coconino Sandstone:		
Sandstone, buff	63	376
Sandstone, gray	85	461
Sandstone, buff	57	518
Sandstone, yellow	11	529
Sandstone, white	38	567
Sandstone, buff, water at 590 feet	45	612
Sandstone, white	4	616
Sandstone, buff	37	653
Sandstone, white	9	662
Sandstone, buff	22	684
(A-21-5)2abc1		
QUATERNARY:		
Alluvium:		
Soil	2	2
TERTIARY:		
Volcanic rocks and silt:		
Malpais and caliche	13	15
Malpais	53	68
Clay, yellow	48	116
Malpais	6	122

Table 3. --Modified drillers' logs of selected wells in southern Coconino County——Continued

(A-21-7)5aab

	Thickness (feet)	Depth (feet)
QUATERNARY:		
Alluvium:		
Soil	5	5
QUATERNARY AND TERTIARY(?):		
Volcanic rocks and silt:		
Lava, solid	58	63
Clay and shale, red	7	70
Lava, broken	5	75
Red clay and layers of lava	30	105
Lava, medium-hard	15	120

(A-21-7)5aac

	Thickness (feet)	Depth (feet)
QUATERNARY:		
Alluvium:		
Soil	2	2
QUATERNARY AND TERTIARY(?):		
Volcanic rocks and silt:		
Lava, hard	38	40
Lava, broken	2	42
Lava, gray	3	45
Lava, streaks of brown clay	12	57
Clay, red	9	66
Layers of red clay	14	80
Lava, medium-hard	27	107
Lava with layers of red clay	23	130

(A-21-7)5acc

	Thickness (feet)	Depth (feet)
QUATERNARY:		
Alluvium:		
Soil and cinders	10	10
QUATERNARY AND TERTIARY(?):		
Volcanic rocks, silt, and sand:		
Silty clay and cinders	10	20
Cinders, sandy; water at 27 feet	7	27
Cinders, silty clay with thin layers of lava	18	45
Cinders, silty clay with thin layers of hard lava	5	50
Cinders and less lava	10	60
Cinders and very hard lava	10	70
Small cinders and clay with broken lava	20	90
Clay, red	15	105
Lava, medium-hard	7	112
Clay, red	12	124
Lava, hard	2	126

(A-21-7)5bab

	Thickness (feet)	Depth (feet)
QUATERNARY:		
Alluvium:		
Soil	7	7
QUATERNARY AND TERTIARY(?):		
Volcanic rocks, silt, sand, and gravel:		
Lava, boulders and fill	13	20
Lava and cinders, water at 46 feet	39	59
Lava, hard	14	73
Lava, broken	15	88
Lava, solid	15	103
Lava, some water	8	111
Red clay and cinders	8	119
Lava, red, hard	8	127
Red clay with layers of lava	27	154
Red clay and shale	16	170

(A-21-7)5dab

	Thickness (feet)	Depth (feet)
QUATERNARY AND TERTIARY(?):		
Volcanic rocks and silt:		
Boulders and clay	22	22
Cinders and clay	5	27
Lava, hard	36	63
Lava, broken, medium-hard	46	109
Red clay and cinders	25	134
Red clay and some cinders	21	155

(A-21-7)21ccd

	Thickness (feet)	Depth (feet)
TRIASSIC:		
Moenkopi Formation:		
Sandstone, Moenkopi	15	15
PERMIAN:		
Kaibab Limestone:		
Limestone, Kaibab	300	315
Toroweap Formation and Coconino Sandstone undifferentiated:		
Coconino, red, pink, thin streaks of yellow	195	510
Coconino, yellow and white	595	1,105
Clay, brown, with fine sand	20	1,125
Coconino, yellow	20	1,145
PERMIAN AND PENNSYLVANIAN:		
Supai Formation:		
Shale with fine sand, light-brown, getting darker	55	1,200

(A-21-7)26ab

	Thickness (feet)	Depth (feet)
PERMIAN:		
Kaibab Limestone:		
Kaibab Limestone, white and cream, very hard, no cracks; ½ gpm at 73 feet and 1½ gpm at 230 feet	294	294
Toroweap Formation:		
Sandstone, white, Coconino	3	297

Table 3.--Modified drillers' logs of selected wells in southern Coconino County—Continued

	Thickness (feet)	Depth (feet)
(A-21-9)10bbc		
QUATERNARY:		
Volcanic rocks:		
Boulders	10	10
Cinders	15	25
Malpais, hard	47	72
Malpais boulders	6	78
TRIASSIC(?):		
Moenkopi(?) Formation:		
Moenkopi	20	98
PERMIAN:		
Kaibab Limestone:		
Lime	284	382
Coconino Sandstone:		
Sand, Coconino	454	836
Supai, brown	294	1,130
PERMIAN AND PENNSYLVANIAN:		
Supai Formation:		
Sandstone, red, hard	90	1,220
Sandstone, red with soft streaks; hit water at 1,245 feet	118	1,338
(A-21-9)14ccb		
QUATERNARY:		
Alluvium:		
Soil	1	1
Volcanic rocks:		
Lava flows	127	128
PERMIAN:		
Kaibab Limestone:		
Lime, Kaibab	192	320
Coconino Sandstone:		
Coconino, white, cream	160	480
Loose sand, sandstone	259	739
Sandstone, cream, yellow, hard	201	940
Sandstone, light-brown, hard	133	1,073
PERMIAN AND PENNSYLVANIAN:		
Supai Formation:		
Sandstone, dark-brown, first water at 1,215 feet	142	1,215
Sandstone, brown, red	100	1,315
(A-21-10)16bd		
QUATERNARY:		
Alluvium:		
Cinders, boulders, clay	20	20
PERMIAN:		
Kaibab Limestone:		
Limestone, Kaibab	45	65
Limestone, white, very hard	82	147
No record	67	214
Limestone, white, very broken at 214 feet	51	265
Limestone, yellow	28	293
Coconino Sandstone:		
Sandstone, yellow, Coconino	18	311
No record	9	320
Sandstone, white, hard, very broken at 320 feet	310	630
Sandstone, yellow, very broken	40	670
Sandstone, white, hard	110	780
Sandstone, yellow, first water at 988 feet	238	1,018
Sandstone, light-cream	32	1,050
(A-21-11)24d		
PERMIAN:		
Kaibab Limestone:		
Lime, white, very broken cracks and crevasse	100	100
Lime, white, very broken cracks, hard to keep hole straight	100	200
Lime, white to grayish, hard	55	255
Coconino Sandstone:		
Sandstone, medium-hard	45	300
Sandstone, yellow, soft	100	400
Sandstone, yellow, soft	69	469
Underground cave opening	8	477
Sand pocket, sand running in	13	490
Yellow, white streaks	10	500
Sandstone, white	25	525
Sandstone, yellow, soft	75	600
Sandstone, yellow, soft, with sand pocket	27	627
Sandstone, soft, with sand pocket at 643 feet	48	675
Sandstone, yellow, bearing water	63	738
(A-21-12½)36bd		
PERMIAN:		
Kaibab Limestone:		
Limestone boulders	4	4
Limestone	16	20
Limestone	195	215
Coconino Sandstone:		
Sandstone, yellow	25	240
Sandstone, white	110	350
Sandstone, yellow	130	480
Sandstone, white	73	553
(A-21-13)22ad		
TRIASSIC:		
Moenkopi Formation:		
Surface soil and red shale	12	12
Limestone, red	8	20
Shale, red	10	30
PERMIAN:		
Kaibab Limestone:		
Shale, yellow	5	35
Sandstone, yellow	45	80
Limestone, buff	120	200
Coconino Sandstone:		
Sandstone, buff	10	210
Sandstone, gray	10	220
Sandy shale, yellow	3	223
Sandstone, white, water-bearing	6	229
Sandstone, yellow	24	253

Table 3. --Modified drillers' logs of selected wells in southern Coconino County—Continued

	Thickness (feet)	Depth (feet)
(A-22-2)27d		
QUATERNARY:		
Alluvium:		
Sand and gravel	8	8
Boulders	8	12
Clay and sand	28	40
QUATERNARY AND TERTIARY:		
Volcanic rocks:		
Cinders	30	70
Cinders, black	85	135
Cinders, red	23	158
Lava rock	4	162
Malpais	18	180
Cinders	18	198
Malpais	15	213
Cinders	16	229
Malpais	32	261
Cinders	15	278
Malpais	39	315
Cinders	44	359
Malpais	46	405
Cinders	10	415
Malpais	60	475
Cinders	42	517
PERMIAN:		
Kaibab Limestone, Toroweap Formation, and Coconino Sandstone undifferentiated:		
Limestone, gray, clay	9	526
Limestone	19	545
Clay and limestone	9	554
Clay and sandstone	8	560
Shale, red, and sandstone	24	584
Sandstone, yellow	16	600
Shale, red, and sandstone	16	616
Shale, gray	9	625
Limestone, hard	13	638
Granite	13	651
Limestone	24	675
Limestone and shale	10	685
Limestone	5	690
Sandstone	5	695
Sandstone, Coconino	8	703
Sandstone, white	13	716
Shale, gray	7	723
Coconino sandstone	20	743
Sandstone	6	749
Shale, yellow	20	769
Shale, hard	7	776
Sandstone	24	800
Sandstone, Coconino	5	805
Sandstone, red	10	815
Shale, gray	6	821
Sandstone, gray	5	826
Sandstone	14	840
Sandstone, hard	1	841
Sandstone, gray	5	846
Sandstone	14	860
Shale, red	2	862
Sandstone	9	871
Sandstone, hard	9	880
Sandstone	21	901
Sandstone, white	11	912
Sandstone and shale	32	944
Shale, yellow	6	950
Sandstone	5	955
Clay, yellow	7	962
Clay and sandstone	9	971
Clay, red	4	975
No record	9	984
Sand, red, fine	16	1,000
Sand, red	20	1,020
(A-22-3)26bca		
QUATERNARY:		
Alluvium:		
Topsoil	8	8
QUATERNARY AND TERTIARY:		
Volcanic rocks:		
Cinders, red, silty	84	92
Lava, black	4	96
Lava, gray; some cracks at 126 to 128 feet	69	165
Cinders, red	30	195
Lava	117	312
Fine red cinders and ash; seep of water at 317 feet	5	317
PERMIAN:		
Kaibab Limestone:		
Sandy lime, fine	1	318
Limestone, white, gray and reddish streaks; easy drilling	204	522
(A-22-4)26dc		
QUATERNARY:		
Alluvium:		
Clay	6	6
TERTIARY:		
Volcanic rocks:		
Basalt boulders	14	20
Basalt	66	86
Cinders, reddish	21	107
PERMIAN:		
Kaibab Limestone:		
Rock, gray, very hard	17	124
(A-22-6)23bcb		
QUATERNARY:		
Alluvium:		
Topsoil	2	2
Dirt and cinders	29	31
QUATERNARY AND TERTIARY(?):		
Volcanic rocks:		
Malpais, gray	31	62
Cinders, red	6	68
Malpais, gray	31	99
Cinders, red	15	114
Malpais, black, hard	18	132
Cinders, black	15	147
Malpais, black, hard	17	164
Cinders, red	27	191

Table 3. --Modified drillers' logs of selected wells in southern Coconino County—Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
(A-22-6)23dba					
QUATERNARY:			TERTIARY AND TRIASSIC UNDIFFERENTIATED:		
Alluvium:			Volcanic rocks and Moenkopi Formation undifferentiated:		
Topsoil	12	12	Cinders, red, and red and blue shale	24	212
QUATERNARY(?) AND TERTIARY:			TRIASSIC:		
Volcanic rocks:			Moenkopi Formation:		
Cinders	82	94	Red shale and sandstone	64	276
Malpais	33	127			
Cinders, red	21	148			
Malpais	40	188			
(A-22-6)23dca					
QUATERNARY:			QUATERNARY AND TERTIARY(?):		
Alluvium:			Volcanic rocks:		
Clay, dark-brown	28	28	Basalt flow, black, hard	19	97
Clay and boulders	15	43	Red cinders and boulders	6	103
Cinders and clay	22	65	Broken rock, cinders, red and black	11	114
Red cinders and boulders	13	78			
(A-22-6)25cac2					
QUATERNARY:			Malpais, hard	4	114
Alluvium:			Clay, boulders, and cinders	41	155
Clay and boulders	20	20	Clay, red	8	163
QUATERNARY AND TERTIARY:			Malpais, hard	34	197
Volcanic rocks, silt, sand, and gravel:			Malpais, red	4	201
Malpais, medium-hard	23	43	TRIASSIC:		
Boulders and cemented cinders	24	67	Moenkopi Formation:		
Malpais, hard, broken	12	79	Shale, red, and Moenkopi	15	216
Broken red cinders and boulders, some clay	2	81	Sandstone, red	15	231
Malpais ledge; hole drifted some	6	87	Shale, red	27	258
Red clay and boulders and gravel	23	110			
(A-22-6)25cbd					
QUATERNARY:			Malpais, hard	60	115
Alluvium:			Brown cinders and clay	6	121
Clay and boulders	39	39	Clay, brown	12	133
QUATERNARY AND TERTIARY:			Malpais, broken	33	166
Volcanic rocks and silt:			TRIASSIC:		
Malpais, basalt	8	47	Moenkopi Formation:		
Broken malpais and cinders	8	55	Shale, red, and Moenkopi	94	260
(A-22-6)26aaa					
QUATERNARY:			TRIASSIC:		
Alluvium:			Moenkopi Formation:		
Alluvium, water stratum at 75 feet, 20 gpm	75	75	Sandstone, Moenkopi, lost water in crevices	269	495
QUATERNARY AND TERTIARY:			PERMIAN:		
Volcanic rocks, silt, and gravel:			Kaibab Limestone:		
Clay, red	9	84	Limestone, Kaibab; a little water at 724 feet, lost in crevice	249	744
Volcanic cinders, brown	7	91	Toroweap Formation and Coconino Sandstone undifferentiated:		
Clay, red	2	93	Sandstone, very red, soft	6	750
Volcanic cinders, brown	30	123	Sandstone, Coconino	271	1,021
Lava flow	21	144	Sand, white, Coconino	514	1,535
Volcanic cinders, brown; water stratum from 144 to 146 feet, tested 20 gpm	23	167	PERMIAN AND PENNSYLVANIAN:		
Lava flow	47	214	Supai Formation:		
Gravel or conglomerate	12	226	Sand, red, Supai	5	1,540
(A-22-6)26daa					
QUATERNARY:			Malpais boulders and clay	10	55
Alluvium:			Cinders and clay, some boulders	20	75
Soil	5	5	Clay, tight, tested 15 gpm	15	90
Clay, yellow, and gravel	10	15	TERTIARY(?):		
Clay, yellow, and boulders	10	25	Volcanic rocks:		
Cinders and malpais boulders, some water at 25 feet	20	45	Malpais, hard	26	116
			Cinders	2	118

Table 3. --Modified drillers' logs of selected wells in southern Coconino County——Continued

	Thickness (feet)	Depth (feet)
(A-22-6)26daa——Continued		
Malpais	12	130
Malpais, broken, water, 2 gpm	35	165
Malpais, solid, more water at 195 feet	30	195
Malpais boulders and cinders	15	210
TRIASSIC:		
Moenkopi Formation:		
Moenkopi	17	227
(A-22-7)32cbb		
QUATERNARY:		
Alluvium:		
Topsoil	3	3
Boulders, sand, cinders	9	12
Gravel and cinders	133	145
Boulders and cinders	20	165
TRIASSIC:		
Moenkopi Formation:		
Sandstone, red	15	180
Shale, red	22	202
(A-22-7)32dda		
QUATERNARY:		
Alluvium:		
Conglomerate	55	55
TERTIARY(?):		
Volcanic rocks:		
Malpais	45	100
TRIASSIC:		
Moenkopi Formation:		
Moenkopi; first water at 100 feet	100	200
(A-22-7)33cca		
QUATERNARY AND TERTIARY:		
Volcanic rocks, silt, and sand:		
Sand, light-brown, and cinders	10	10
Cinders, brown	60	70
Cinders, black; water level 70 feet	10	80
Lava rock	10	90
Red cinders and clay or ash	10	100
TRIASSIC:		
Moenkopi Formation:		
Shale, red, Moenkopi	110	210
(A-22-7)34dc		
QUATERNARY:		
Alluvium:		
Brown sand, clay, and boulders	77	77
Granite boulder fill, gray	92	169
TRIASSIC:		
Moenkopi Formation:		
Red shale, clay, and sandstone; water	201	370
(A-22-8)16dad		
QUATERNARY:		
Alluvium:		
Sand, topsoil, and cinders	3	3
TERTIARY:		
Volcanic rocks:		
Sand and hard cinders	67	70
Cinders, black, hard	20	90
Cinders, red	30	120
Lava, malpais, hard	10	130
Lava, hard	10	140
Lava, extremely hard	15	155
Lava and cracks	15	170
Lava with loose caving layers	5	175
Lava, cinders, caving	30	205
Lava, caving	2	207
Lava, hard	40	247
Lava	4	251
Cinders	39	290
Lava, vertical cracks	2	292
Lava, black	8	300
Lava	20	320
Lava, hard	10	330
Lava and cinders	30	360
PERMIAN:		
Kaibab Limestone:		
Limestone, Kaibab	55	415
Limestone, yellow	85	500
Limestone	110	610
Coconino Sandstone:		
Sandstone, gray, Coconino	70	680
Sandstone and shale	225	905
Sandstone, caving	35	940
Sandstone, gray	70	1,010
Sandstone	140	1,150
Sandstone, yellow	100	1,250
Sandstone	160	1,410
PERMIAN AND PENNSYLVANIAN:		
Supai Formation:		
Sandstone, reddish-brown	140	1,550
Shale and sandstone, red, Supai	55	1,605
Sandstone and shale, Supai	50	1,655
Sandstone and shale, red	25	1,680
Sandstone, red	20	1,700
Sandstone, Supai	55	1,755

Table 3. --Modified drillers' logs of selected wells in southern Coconino County—Continued

	Thickness (feet)	Depth (feet)
(A-22-8)33bda		
QUATERNARY:		
Alluvium:		
Soil, loose rock, little clay	29	29
Boulders	5	34
Soil and loose rock	84	118
Sandstone, red	23	141
Soil and loose rock	56	197
Soft tuff or lava, small strip of gravel at 217 feet	96	293
PERMIAN:		
Kaibab Limestone:		
Limestone, Kaibab	117	410
(A-22-9)29bac		
QUATERNARY:		
Volcanic rocks, silt, and sand:		
Cinders	40	40
Clay-cinder mix	18	58
Malpais, very hard	26	84
Malpais, red, soft	46	130
Cinders, clay, sand	50	180
PERMIAN:		
Kaibab Limestone:		
Lime, Kaibab, no cracks	295	475
Coconino Sandstone:		
No record	130	605
Coconino, very broken	440	1,045
PERMIAN AND PENNSYLVANIAN:		
Coconino Sandstone and Supai Formation undifferentiated:		
Supai, pink, red	405	1,450
(A-22-11)35bc		
QUATERNARY:		
Volcanic rocks:		
Malpais boulders, black	24	24
Boulders, red, a form of malpais	6	30
PERMIAN:		
Kaibab Limestone:		
Lime, white	70	100
Lime, white, no cracks	100	200
Lime, yellow, base of Kaibab 240 feet	40	240
PERMIAN AND PENNSYLVANIAN:		
Coconino Sandstone and Supai Formation undifferentiated:		
Sandstone	60	300
Sandstone, white	100	400
Sandstone, white, cutting good, wearing cable	100	500
Sandstone, white	200	700
Sandstone, white, water	33	733
Sandstone, water-bearing, 610 feet water sand	107	840
Sandstone, yellow, bearing water, tested 10 gpm	10	850
Sandstone, yellow, no water	155	1,005
No record	156	1,161
(A-23-8)16dcd1		
QUATERNARY:		
Volcanic rocks, silt, sand, and gravel:		
Soil	2	2
Cinders, brown	11	13
Silt, fine	8	21
Cinders, black	54	75
Cinders, black; large boulders	18	93
Lava flow, black, hard	36	129
Gravel, sand, boulders, and clay	361	490
Lava flow, black, hard	34	524
Flow, black, red, broken	12	536
Lava flow, black, hard	16	552
Red burned clay, sand	21	573
Brown clay, sand, and gravel	31	604
(A-23-11)28a		
QUATERNARY:		
Volcanic rocks:		
Cinders	58	58
Lava	47	105
PERMIAN:		
Kaibab Limestone:		
Lime, gray	163	268
Lime, red	82	350
Coconino Sandstone:		
Sand rock	295	645
Water sand, water	20	665
Sand, pink	92	757
(A-24-1)16dcb		
QUATERNARY:		
Alluvium:		
Boulders and clay	20	20
PERMIAN:		
Kaibab Limestone:		
Limestone, hit water at 330 feet	310	330
Toroweap Formation:		
Clay and shale, red	60	390
Limestone	5	395

Table 3. --Modified drillers' logs of selected wells in southern Coconino County——Continued

	Thickness (feet)	Depth (feet)
(A-24-1)28ccd		
QUATERNARY:		
Alluvium:		
Boulders and soil fill	20	20
PERMIAN:		
Kaibab Limestone:		
Lime, Kaibab, very broken	45	65
Lime, Kaibab, very hard	30	95
Lime, Kaibab, hard	75	170
Lime, Kaibab, bad cracks	35	205
Lime, Kaibab, very broken and hard	40	245
Lime, Kaibab, soft	60	305
Toroweap Formation:		
Sandy shale, red	15	320
Sandy shale, red; thin layer of sandstone	100	420
Limestone, Kaibab	75	495
Shale, red; thin layer of sandstone	15	510
Limestone, dark-red, Kaibab	30	540
Coconino Sandstone:		
Sandstone, Coconino	55	595
Coconino	20	615
Coconino, brown	15	630
Coconino, white	40	670
Coconino, white, caving	40	710
Coconino, cream-colored	40	750
Coconino, white	50	800
Coconino, pink	43	843
Sandstone, light-brown, very hard	97	940
PERMIAN AND PENNSYLVANIAN:		
Supai Formation:		
Sandstone, light-red	45	985
Sandstone, red, Supai	45	1,030
Supai, red, broken; losing drilling water	40	1,070
Sandstone, red, Supai	40	1,110
Shale and sandstone, red	30	1,140
(A-24-5)11cac		
QUATERNARY:		
Alluvium:		
Clay and boulders	3	3
TERTIARY:		
Volcanic rocks and sand:		
Cinders and boulders	34	37
Malpais, black, hard	31	68
Malpais, black, broken, very hard, lost water	25	93
Malpais, black, very hard, lost water	9	102
No cuttings, hard and broken	15	117
Malpais, black, hard	6	123
Malpais, red; layers of red boulders and cinders	52	175
Cinders and boulders, red, black, brown, cavey	22	197
Malpais, black, hard	73	270
Boulders, cinders, red, cavey	6	276
Malpais, black, hard	59	335
Sand, brown, fine	11	346
(A-24-5)11cdb		
QUATERNARY:		
Alluvium:		
Soil	6	6
TERTIARY:		
Volcanic rocks:		
Lava cinders	24	30
Malpais, black, hard	60	90
Boulders and cinders, black and red, loose	15	105
Malpais, red	10	115
Cinders, red and black	30	145
Malpais, black, hard	30	175
Malpais boulders and cinders, black	30	205
Malpais, black	75	280
Cinders, red	12	292
(A-25-1)22bd		
QUATERNARY AND TERTIARY(?):		
Alluvium:		
Soil and gravel	25	25
Shale, red	10	35
Shale, light-brown, hard	5	40
Rock, yellow	15	55
Rock, red	25	80
Mud rock, red; water	10	90
Rock, brown, hard	10	100
Rock, red; broke through in water at 105 feet, unable to bail dry	9	109
(A-25-5)27ccb		
QUATERNARY AND TERTIARY:		
Volcanic rocks and gravel:		
No record	116	116
Malpais, broken, and cinders	5	121
Malpais, black, hard	64	185
Conglomerate fill, yellow and red	80	265
Malpais, hard, broken	38	303
PERMIAN:		
Kaibab Limestone:		
Limestone, red and white, Kaibab	17	320
(A-25-6)20baa		
QUATERNARY:		
Alluvium:		
Malpais boulders, sand, and clay	55	55
TRIASSIC:		
Chinle Formation:		
Petrified Forest Member:		
Chinle, red	5	60

Table 3.--Modified drillers' logs of selected wells in southern Coconino County—Continued

	Thickness (feet)	Depth (feet)
(A-25-6)20bbb		
QUATERNARY:		
Alluvium:		
Malpais boulders	35	35
TRIASSIC:		
Chinle Formation:		
Petrified Forest Member:		
Chinle, gray and white; ½ gpm at 80 feet	45	80
Shinarump Member:		
Shinarump, gray and white; 1 gpm at 115 feet	35	115
TRIASSIC:		
Moenkopi Formation:		
Sandstone and shale, Moenkopi	319	434
PERMIAN:		
Kaibab Limestone:		
Limestone, Kaibab; water stands 30 feet from bottom, 15 gpm	3	437
(A-25-6)20bdd		
QUATERNARY:		
Alluvium:		
Boulders and soil	6	6
TERTIARY:		
Volcanic rocks:		
Malpais; water from 92 to 112 feet	106	112
TRIASSIC:		
Chinle Formation:		
Petrified Forest Member:		
Shale, red	30	142
(A-25-9)6cca		
QUATERNARY:		
Alluvium:		
Cinders, red	49	49
PERMIAN:		
Kaibab Limestone:		
Lime, yellow	21	70
Lime, crack	65	135
Lime, light-brown	45	180
Lime, light-yellow	45	225
Lime, white	40	265
Lime, yellow	40	305
Coconino Sandstone:		
Sandstone, buff or reddish-yellow	185	490
Sandstone, yellow	785	1,275
PERMIAN AND PENNSYLVANIAN:		
Supai Formation:		
Sandstone, red	75	1,350
Sandstone, buff	30	1,380
Sandstone, red	178	1,558
Sandstone, yellow; water at 1,670 feet	242	1,800
(A-26-8)1b		
TRIASSIC:		
Moenkopi Formation:		
Shale, red, Moenkopi	100	100
PERMIAN:		
Kaibab Limestone:		
Limestone, gray	230	330
Coconino Sandstone:		
Sandstone, red	10	340
Sandstone, gray	320	660
Sandstone, yellow	160	820
Sandstone, grayish-blue	100	920
PERMIAN AND PENNSYLVANIAN:		
Coconino Sandstone and Supai Formation undifferentiated:		
Sandstone, red	630	1,550
(A-26-9)15ac		
PERMIAN:		
Kaibab Limestone:		
Limestone, white	200	200
Sandy limestone, red	42	242
Coconino Sandstone:		
Sandstone, white, hard	206	448
Sandstone, buff, hard	164	612
Sandstone, pink, soft	436	1,048
Sandstone, light-yellow, hard	102	1,150
PERMIAN AND PENNSYLVANIAN:		
Supai Formation:		
Sandstone, pink, hard; small show of water at 1,152 feet, 4 gpm at 1,200 feet	50	1,200
Sandstone, yellow and pink; 18 gpm at 1,250 feet	50	1,250
(A-26-9)33dac		
QUATERNARY:		
Alluvium:		
Boulders and caliche	10	10
TERTIARY:		
Volcanic rocks:		
Malpais	60	70
PERMIAN:		
Kaibab Limestone:		
Limestone, blue, very hard	50	120
Limestone, yellow	10	130
Limestone, white	180	310
Coconino Sandstone:		
Sandstone, white, very hard	220	530
Sandstone, yellow, medium-hard	170	700
Sandstone, red, medium-hard	200	900
Sandstone, white, very hard	90	990
Sandstone, yellow, very hard	240	1,230
PERMIAN AND PENNSYLVANIAN:		
Supai Formation:		
Shale, red, sandy	20	1,250
Sandstone, red	190	1,440

Table 3. --Modified drillers' logs of selected wells in southern Coconino County—Continued

	Thickness (feet)	Depth (feet)
(A-27-1)29c		
PERMIAN:		
Kaibab Limestone:		
Rock and sandstone, broken	10	10
Rock, yellow	20	30
Lime, cream-colored	15	45
Sandstone, yellow	30	75
Rock, yellow	15	90
Rock, brown	13	103
Lime, cream-colored	24	127
Lime, light	9	136
Sandstone, white	34	170
Lime, cream-colored	77	247
Sandstone, brown, and white lime	43	290
Rock, dark, hard	30	320
Lime, light-colored	90	410
Toroweap Formation:		
Shale, red	60	470
Sandstone, yellow	15	485
Sandy shale, red	20	505
Shale, light-brown	15	520
Shale, red	10	530
Rock, light-brown	20	550
Lime, cream-colored	35	585
Rock, dark, and yellow shale	50	635
Shale, yellow, and light-colored lime	30	665
Coconino Sandstone:		
Sandstone, light-colored	35	700
Sandstone, light with red specks	85	785
Sandstone, red and light-colored	33	818
Sandstone, light	134	952
Sandstone, red	193	1,145
Sandstone, light	30	1,175
Sandy shale, yellow	10	1,185
Sandstone, yellow	55	1,240
Sandstone, light	39	1,279
PERMIAN AND PENNSYLVANIAN:		
Hermit Shale and Supai Formation undifferentiated:		
Shale, dark-red; water seep, 2½ gallons per hour	3	1,282
Shale, red, hard	25	1,307
Sandstone, light	8	1,315
Shale, red	5	1,320
Sandstone, light, hard	5	1,325
Shale, dark-red	35	1,360
Sandstone, light, hard	10	1,370
Sandstone, light; red shale; specks of blue shale	10	1,380
Shale, dark-red	15	1,395
Shale, light-red	4	1,399
Sandstone, light	7	1,406
Shale, dark-red	4	1,410
Sandstone, light	30	1,440
Sandstone, reddish	30	1,470
(A-28-9)35bac		
TRIASSIC:		
Chinle Formation:		
Shinarump Member:		
Shale, red	40	40
Sandstone	15	55
Shale, red	15	70
Sandstone, seep of water, not enough for drilling	12	82
Moenkopi Formation:		
Shale, red	338	420
Sandy shale	15	435
Shale, red	65	500
Sandy shale, red	20	520
PERMIAN:		
Kaibab Limestone:		
Lime rock	220	740
Crevasse	5	745
Lime and sandstone	40	785
Sandstone, poorly cemented and some runs	43	828
(A-29-1)29b		
QUATERNARY AND TERTIARY(?):		
Alluvium:		
Soil	4	4
Clay	6	10
Gravel and clay	12	22
Clay, red	15	37
Gravel, clay	18	55
Clay	10	65
TRIASSIC:		
Moenkopi Formation:		
Shale, red, hard, Moenkopi	15	80
Sandstone, red, hard	8	88
Shale, red	2	90
Sandstone, red	5	95
Shale, red	7	102
PERMIAN:		
Kaibab Limestone:		
Lime, Kaibab	3	105
Lime, white, medium-hard	85	190
Lime, yellow, medium-hard	30	220
Lime, white, medium-hard	65	285
Lime, blue, very hard	40	325
Lime, yellow, medium-hard	15	340
Lime, light-yellow, medium-hard	30	370
Lime, blue, very hard	32	402
Lime, white, medium-hard	56	458
Lime, gray, medium-hard	16	474
Lime, blue, medium-hard	6	480
Lime, white, medium-hard	10	490
Lime, light-blue, very hard	14	504
Toroweap Formation:		
Lime, light-red, soft, Toroweap	126	630
Lime, buff, soft	20	650
Lime, white, soft	20	670
Lime, pink, soft	72	742
Coconino Sandstone:		
Sandstone, light-red, Coconino	83	825
Sandstone, white and pink	15	840
Sandstone, pink	100	940
Sandstone, light-red	30	970
Sandstone, white	120	1,090
Sandstone, pink and red	122	1,212
PERMIAN AND PENNSYLVANIAN:		
Hermit Shale and Supai Formation undifferentiated:		
Shale and sandstone, red, Supai	63	1,275

Table 3. --Modified drillers' logs of selected wells in southern Coconino County——Continued

(A-29-1)29dc

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
QUATERNARY:			Toroweap Formation:		
Alluvium:			Shale, red, sandy	130	490
Topsoil	6	6	Shale, blue, sandy	30	520
Clay and sand	9	15	Lime, pink	50	570
Sand and gravel	5	20	Shale, brilliant-red, sandy	10	580
PERMIAN:			Coconino Sandstone:		
Kaibab Limestone:			Sandstone, orange	110	690
Lime, gray	10	30	Sandstone, pink and orange	90	780
Lime, yellow	10	40	Sandstone, gray	30	810
Lime, gray	30	70	Sandstone, gray and yellow	130	940
Lime, gray, hard	10	80	Sandstone, white	47	987
Lime, white	30	110	PERMIAN AND PENNSYLVANIAN:		
Lime, yellow	70	180	Hermit Shale and Supai Formation undifferentiated:		
Lime, gray	50	230	Stone, pink and red, layers of red shale; hit water at 1,020, ½ gpm	143	1,130
Lime, yellow	70	300			
Lime, gray, hard	40	340			
Lime, blue	20	360			

(A-30-2)17

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
QUATERNARY:			Silica	9	369
Alluvium:			Limestone	131	500
Surface soil and silica	22	22	Coconino Sandstone:		
PERMIAN:			Sandstone	64	564
Kaibab Limestone:			Sandstone, red	61	625
Limestone	45	67	Sandstone, red and yellow	50	675
Silica, soft	11	78	Sandstone, light-pink and yellow	25	700
Limestone	35	113	No record	19	719
Limestone and silica, hard	4	117	Limestone, yellow	40	759
Limestone	86	203	Sandstone, yellow	136	895
Toroweap Formation:			Hermit Shale:		
Limestone, red	122	325	Shale, red	5	900
Limestone	35	360	Shale, red, hard	100	1,000

(A-30-2)24bbb

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
QUATERNARY:			Toroweap Formation:		
Alluvium:			Clay, red	90	485
Soil	25	25	Sandy clay	10	495
Broken rock	3	28	Lime, hard; show of water at 530 feet	75	570
Soil and clay	12	40	Lime, yellow	50	620
PERMIAN:			Clay, red	35	655
Kaibab Limestone:			Sandy clay, red	5	660
Lime, Kaibab	79	119	Coconino Sandstone:		
Lime, real hard	5	124	Coconino, yellow	20	680
Lime, yellow	71	195	Coconino, pink, showing of clay	15	695
Lime, gray, hard	50	245	Coconino, gray	15	710
Lime, hard, some cracks	150	395	Coconino, white	20	730

(A-30-2)25b

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
PERMIAN:			Toroweap Formation:		
Kaibab Limestone:			Sandy limestone, red, soft	37	385
Limestone, yellow	15	15	Sandy limestone, light-red, hard	19	404
Limestone, yellowish-red, sandy	15	30	Sandy limestone, light-red, soft	36	440
Limestone, dark-yellow	20	50	Limestone, yellow, soft	18	458
Limestone, white, hard	8	58	Sandy limestone, light-red, soft	12	470
Lime, white, hard, very fractured, crevices	14	72	Limestone, buff, very hard	10	480
Limestone, white, hard	14	86	Limestone, buff, medium-hard	20	500
Limestone, light-yellow, hard, more crevices	16	102	Limestone, light-yellow, very hard	30	530
Limestone, dark-yellow, hard	20	122	Limestone, buff, medium-hard	20	550
Limestone, light-yellow, hard, more crevices	53	175	Sandy limestone, light-red, soft	20	570
Limestone, light-yellow, medium-hard	80	255	Sandy limestone, red, soft	20	590
Limestone, light-yellow, very hard	93	348	Sandy limestone, buff	18	608
			Coconino Sandstone:		
			Sandstone, light-yellow, hard	22	630

Table 3.--Modified drillers' logs of selected wells in southern Coconino County——Continued

(A-30-2)25c

	Thickness (feet)	Depth (feet)
PERMIAN:		
Kaibab Limestone:		
Lime, light-yellow	362	362
Toroweap Formation:		
Sandy lime, red	134	496
Sandstone, red	9	505
Lime, gray	18	523
Lime, light-gray, 2½ gpm	61	584
Lime, light-red	14	598
Lime, light-gray	32	630
Lime, light-red	6	636
Coconino Sandstone:		
Sandstone, buff-colored	294	930
Sandstone, white	35	965
Sandstone, pink	10	975
Sandstone, white	10	985
Sandstone, buff-colored	111	1,096
PERMIAN AND PENNSYLVANIAN:		
Hermit Shale and Supai Formation undifferentiated:		
Shale, red	224	1,320
Sandstone and shale, red	80	1,400

(B-24-8)17dc1

	Thickness (feet)	Depth (feet)
QUATERNARY:		
Alluvium:		
Adobe and gravel	70	70
MISSISSIPPIAN AND DEVONIAN UNDIFFERENTIATED:		
Redwall Limestone and Martin Limestone undifferentiated:		
Limestone	184	254
Quartzite	20	274
Porphyry	11	285
Quartzite	5	290
Limestone	465	755
CAMBRIAN:		
Muav Limestone and Bright Angel Shale undifferentiated:		
Shale and limestone	25	780
Limestone	205	985
Shale, blue	35	1,020
Limestone	60	1,080
Shale	45	1,125
Limestone	65	1,190
Shale, blue	155	1,345
Tapeats Sandstone:		
Sandstone, gray	15	1,360
Sandstone, red	355	1,715
PRECAMBRIAN:		
Rock, gray, soft granite	73	1,788

(B-25-3)3cc

	Thickness (feet)	Depth (feet)
QUATERNARY:		
Alluvium:		
Soil	2	2
Boulders and cinders	9	11
Volcanic rocks:		
Malpais, hard, broken; lost water	53	64
Red cinders and clay	9	73
Malpais, black, hard	8	81
Cinders, black	2	83
Malpais, black, hard	16	99
TERTIARY:		
Silt:		
Shale and clay, red	41	140

(B-25-10)10adc

	Thickness (feet)	Depth (feet)
QUATERNARY:		
Alluvium:		
Topsoil	4	4
Cemented conglomerate	17	21
MISSISSIPPIAN:		
Redwall Limestone:		
Limestone, very hard	61	82

(B-26-3)19b

	Thickness (feet)	Depth (feet)
QUATERNARY:		
Alluvium:		
Soil	2	2
Volcanic rocks:		
Malpais, soft	49	51
Malpais, hard	52	103
TERTIARY:		
Silt, sand, and gravel:		
Conglomerate, red sand, and clay; seep at 122 feet	34	137
Shale and clay, red	21	158
Red shale, clay, and sand; seep at 186 feet	29	187
Shale, red, hard	18	205
Sandy shale, brown	9	214
Sand, gray	8	222
Shale, brown	69	291
Sandstone, brown	32	323
Sandy lime, light	11	334
Sandy conglomerate, red	16	350
Lime and boulders	4	354

(B-28-3)12

	Thickness (feet)	Depth (feet)
QUATERNARY AND TERTIARY(?):		
Alluvium:		
Shale, white, yellowish	10	10
Shale, red	10	20
Sandy gravel and shale, red	30	50
PERMIAN:		
Kaibab Limestone:		
Sandy limestone, reddish-gray	13	63
Sandy limestone, buff	57	120
Limestone, pink	20	140
Limestone, white, hard	10	150
Limestone, buff, hard	12	162
Limestone, white, hard	18	180
Limestone, buff, soft	40	220
Limestone, white, hard	10	230
Toroweap Formation:		
Limestone, light-red, soft	22	252
Limestone, buff, soft	38	290

Table 3. --Modified drillers' logs of selected wells in southern Coconino County——Continued

	Thickness (feet)	Depth (feet)
(B-28-3)12——Continued		
Limestone, light-red, soft	10	300
Limestone, white, very hard	60	360
Limestone, light-yellow, hard	22	382
Limestone, light-red, hard	13	395
Limestone, light-buff, hard	45	440
Limestone, dark-buff, hard	12	452
Limestone, white, soft	8	460
Limestone, pink and white, hard	11	471
Limestone, red and pink, hard	49	520
Sandy shale, red and pink	70	590
Limestone, red, gray, and green	110	700
Coconino Sandstone:		
Sandstone, pink, red, and white; seep at 1,140 feet	440	1,140
Hermit Shale:		
Sandy shale, hard	180	1,320
Shale, red, hard	80	1,400
(B-28-7)31c		
QUATERNARY AND TERTIARY(?) UNDIFFERENTIATED:		
Alluvium:		
Topsoil	6	6
Sand and gravel, gravel as much as 6 inches in diameter	13	19
Silty conglomerate, some clay	18	37
Sand and gravel, cemented	92	129
Sandy clay and gravel	21	150
(B-29-1)12dbd		
QUATERNARY:		
Alluvium:		
Soil, gravel, and sand	10	10
PERMIAN:		
Kaibab Limestone:		
Lime, white and cream, very hard	370	380
Toroweap Formation:		
Shale and sandstone, red and brown	125	505
Lime, cream and white, very broken	105	610
Coconino Sandstone:		
Sandstone, cream, white, pink, very hard, broken; first water at 990 feet, ½ gpm	445	1,055
Hermit Shale:		
Sandstone, pink, with thin layers of red shale	17	1,072
Shale, dark-red	8	1,080
(B-30-1)28aaa1		
QUATERNARY:		
Alluvium:		
Surface soil	10	10
Sand and gravel	5	15
PERMIAN:		
Kaibab Limestone:		
Sandstone, yellow	10	25
Sandy limestone, hard	10	35
Shale and sand, yellow	5	40
Sandy limestone, white, hard	35	75
Sandy limestone, yellow	5	80
Limestone, white, hard	40	120
Sandy limestone	30	150
Limestone, white, hard	40	190
Sandy limestone, hard	15	205
Sandy limestone, brown	35	240
Limestone, white	57	297
Limestone, brown	13	310
Limestone, white, hard	2	312
Toroweap Formation:		
Shale, red	2	314
Limestone, white, hard	10	324
Shale, red	2	326
Limestone, white, hard	4	330
Shale, red	5	335
Limestone, white	10	345
Sandy limestone	30	375
Shale, red	3	378
Sand, limestone, and shale	7	385
Shale, red	3	388
Sandy lime and shale	7	395
Red shale and sand	20	415
Limestone, black	5	420
Red shale and sand	25	445
Sandstone, yellow	10	455
Red shale and sand	5	460
Sandstone, yellow	80	540
Sandy shale, gray	15	555
Coconino Sandstone:		
Sandstone, yellow	60	615
Sandstone, white, hard	220	835
Sandstone, light-brown; hit water at 925 feet, rose to 900 feet	155	990
(B-30-1)28baa		
PERMIAN:		
Kaibab Limestone:		
Limestone, yellowish, hard	222	222
Sandstone, fairly soft	33	255
Limestone, hard	110	365
Toroweap Formation:		
Sandstone, reddish-brown	120	485
Sandstone, yellowish-brown	60	545
Sandstone, bluish-black	22	567
Coconino Sandstone:		
Sandstone, yellowish-brown	53	620
Sandstone, white, fine; hit water at 905 feet	410	1,030
Hermit Shale:		
Shale, Hermit	21	1,051

Table 4.--Chemical analyses of water from selected wells and springs in southern Coconino County

[Analyses by U.S. Geological Survey, except as indicated. Analyses in milligrams per liter, except as indicated. Dissolved solids: Sum of determined constituents, except as indicated. Remarks: CT, sample obtained from closed storage tank at well; OT, sample obtained from open storage tank at well; ASHL, analysis by Arizona State Health Laboratory; ATL, analysis by Arizona Testing Laboratories; GSL, analysis by Bureau of Indian Affairs, Gallup Soils Laboratory; stratigraphic names indicate water-bearing strata]

Well or spring location	Date of collection	Temperature (° C)	Silica (SiO$_2$)	Iron (Fe), in solution at time of analysis	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO$_3$)	Carbonate (CO$_3$)	Sulfate (SO$_4$)	Chloride (Cl)	Fluoride (F)	Nitrate (NO$_3$)	Dissolved solids	Hardness as CaCO$_3$		Specific conductance (micromhos at 25° C)	pH	Remarks
																Calcium, magnesium	Noncarbonate			
(A-11-14)22cbd	8-9-66	11	10	0.18	14	4.1	2.5		66	0	1.0	2.0	0	.....	66	52	0	107	7.3	Coconino Sandstone and Supai(?) Formation.
(A-12-7)14	2-16-52	21	14	....	104	40	6.9		485	....	27	9	.1	0.5	440	424	......	753	....	Fossil Springs; Naco Formation.
(A-12-12)33bac	10-17-52	9	8.7	....	26	7.6	.7		111	....	3.1	2	.2	.3	104	96	......	174	....	Tonto Spring; Supai Formation.
(A-13-7)14bab	9-22-66	.....	44	0	32	18	17		180	0	12	22	.4	.....	234	154	6	350	7.6	CT; volcanic rocks, sand, and gravel.
(A-13-13)1ddb	5-15-52	8	9.4	....	62	34	5.1		346	0	12	6	.4	0	299	294	11	540	....	Coconino Sandstone.
(A-14-8)32aa	5-28-59	16	20	....	51	22	5.5		268	....	1.6	6.0	0	.5	239	218	......	401	8.0	Buckhorn Spring; Coconino Sandstone.
(A-14-11)9dca	7-20-66	.....	12	0	78	43	5.3		446	0	5.0	8.0	0	.....	371	370	4	649	7.4	CT; Coconino Sandstone.
12bcd	7-5-46	14	......	....	70	32	4.4		365	0	5.8	5	.2	3.5	301	306	7	549	....	Do.
30ddd	10-26-65	13	......	....	74	26	4.8		358	0	< 1.0	6.5	< .1	.....	....	292	0	532	7.7	Coconino Sandstone.
(A-15-7)14acc	10-19-59	16	23	....	29	10	4.8		147	....	.2	2.5	.2	1.1	143	115	......	236	7.4	Wet Beaver Creek Springs; Coconino Sandstone.
(A-15-11)5bdc	6-22-66	.....	15	0	57	28	4.8		294	0	18	6.5	0	.....	274	258	17	475	7.5	CT; Coconino Sandstone.
(A-15-12)4ccc	11-2-66	13	11	0	70	28	11		302	0	66	8.0	.3	.....	343	304	56	573	7.2	Coconino Sandstone.
15ddc	6-17-66	13	12	0	66	33	2.8		330	0	26	6.0	0	.....	308	300	30	532	7.5	Do.
(A-15-13)18cba	8-3-66	.....	11	.01	57	29	3.0		296	0	18	4.0	.1	.....	268	260	18	467	7.5	Do.
(A-15-14)3bbb	5-5-66	.....	......	....	66	34	3.7		289	0	65	6.5	.1	.....	317	306	69	580	7.9	CT; Coconino Sandstone.
(A-15-15)4bdc	5-5-66	.....	......	....	46	23	3.2		234	0	17	4.0	.1	.....	208	208	16	384	7.7	Coconino Sandstone.
12bbc	11-22-66	16	13	.02	48	21	8.3		244	0	18	5.0	.2	.....	234	208	8	401	7.7	Do.
(A-16-5)24acc	8-7-64	.....	......	....	23	12	9		....	....	6	4	< .1	< 1	a/156	108	......	....	....	ASHL; Supai Formation.
(A-16-6)8ccd	5-23-57	17	17	....	47	20	5.5		233	....	6.2	9.0	.2	1.0	221	200	......	422	7.3	Supai Formation.
(A-16-9)28cbc	9-22-66	.....	36	0	46	22	14		262	0	9.0	8.0	.2	.....	264	206	0	416	7.4	CT; volcanic rocks and silt.
(A-16-11)13bca	11-9-33	.....	......	....	80	31	13		316	0	41	37	.4	.1	358	327	......	....	....	Alluvium.
(A-16-12)9bbb	11-10-33	.....	......	1.20	12	48	< 10		....	....	26	6	.2	.1	205	227	......	....	....	CT; Coconino Sandstone.
	5-11-66	.....	17	0	54	28	3.4		268	0	28	6.0	.2	.....	269	250	30	459	7.5	Coconino Sandstone.

See footnote at end of table.

Table 4. --Chemical analyses of water from selected wells and springs in southern Coconino County——Continued

Well or spring location	Date of collection	Temperature (°C)	Silica (SiO_2)	Iron (Fe), in solution at time of analysis	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids	Hardness as $CaCO_3$		Specific conductance (micromhos at 25° C)	pH	Remarks
																Calcium, magnesium	Noncarbonate			
(A-16-13)19aaa	7-5-46	14	.....	......	43	22	2.8		221	0	18	2	....	2.1	199	198	17	367	....	Coconino Sandstone.
	5-29-66	.....	13	0.01	44	22	3.9		228	0	14	5.0	0.1	....	214	200	13	382	7.3	Do.
(A-16-14)3bba	11-21-33	.....	.....	....	74	35	4.2		262	0	104	10	0	.9	357	328	......	....	....	Do.
	5-3-66	17	.....	....	72	35	6.9		268	0	99	10	.2	....	355	322	103	608	7.7	Do.
(A-16-15)17abc	1-29-34	.....	.....	....	85	38	27		248	0	168	34	.3	.6	475	368	......	....	....	Do.
	7-29-66	.....	14	0	46	39	28		144	0	158	38	0	....	394	274	156	640	7.4	OT; Coconino Sandstone.
(A-17-3)5db	10-10-51	19	15	....	72	27	5.8		341	.....	7.6	10	.2	1.5	307	290	......	543	....	Summers Spring; Redwall Limestone.
(A-17-5)3dbd	5-21-57	17	12	....	54	24	29		277	.....	10	42	.2	.3	308	233	......	526	7.3	Supai Formation.
25aab	2-11-60	.....	.....	....	50	20	7		......	.....	6	1	.1	....	a/217	208	......	....	....	ASHL; Supai Formation.
(A-17-6)8bdb	5-8-62	.....	.....	....	37	16	5		......	.....	< 1	4	.1	1	a/170	160	......	....	....	Do.
18add1 ...	1-19-62	.....	.....	< .05	48	20	6		......	.....	< 1	4	.1	2	a/213	204	......	....	....	Do.
	1-16-67	.....	20	0	50	21	8.5		262	0	8.0	5.0	.2	....	242	212	0	410	7.4	Supai Formation.
30bc	5-22-57	16	17	.02	38	19	10		226	0	4.1	3.5	.2	.5	203	173	0	343	7.1	CT; Supai Formation.
(A-17-13)2baa	5-11-66	14	13	0	75	36	10		252	0	128	12	.1	....	398	334	128	626	7.7	Coconino Sandstone.
(A-17-14)17add	5-3-66	17	.....	....	78	34	8.7		259	0	123	9.0	.1	....	381	334	122	633	7.5	Do.
23bcd ...	11-21-33	.....	.....	....	78	36	7.7		254	0	123	16	0	.7	386	343	......	....	....	Do.
(A-18-4)25bcb	10-10-58	17	12	....	78	38	4.8		398	.....	2.5	18	1.6	4.3	355	351	......	665	7.5	Redwall Limestone and Supai(?) Formation.
(A-18-5)27abb	10-10-58	.....	12	....	71	30	58		302	.....	16	114	.2	.5	451	300	......	829	7.5	Do.
(A-18-7)15ccb2 ...	7-23-65	10	.....	....	25	9.4	6.2		128	0	4	4	< .2	...	....	101	0	214	7.9	Alluvium.
15ccc	5-18-66	.....	31	0	54	0	46		154	0	95	8	.1	....	388	136	......	....	7.8	ATL; alluvium.
27cbb	9-7-65	17	.....	....	17	7.7	12		100	0	6	8.0	< .2	....	....	74	0	197	7.2	Supai Formation.
(A-18-12½)35dda	5-12-66	.....	15	.01	80	34	15		240	0	154	9.0	.3	....	425	338	142	637	7.4	Coconino Sandstone.
(A-18-13)13ccd	11-20-33	.....	.....	....	66	41	14		232	.....	136	21	0	2.1	394	333	......	....	....	Do.
	5-11-66	17	15	0	76	36	16		254	0	126	23	.1	....	417	336	128	655	7.6	Do.
(A-18-14)13abd1 ...	5-4-66	18	.....	....	80	42	247		262	0	132	395	.1	....	1,020	372	158	1,870	7.6	Do.
13abd2 ...	8-25-53	...	19	... ...	60	34	79		264	0	110	92	0	....	531	289	......	....	7.5	ATL; Coconino Sandstone.
	11-17-59	.....	11	....	90	39	254		256	0	110	432	.4	....	1,060	386	......	....	7.2	Do.
	10-25-65	.....	7	....	98	....	389		251	0	325	390	.4	....	1,340	360	......	....	7.5	Do.
	3-3-66	.....	.....	....	82	44	249		258	0	130	410	.2	....	1,040	384	......	1,850	7.5	Coconino Sandstone.
13baa	1-8-55	.....	6.8	....	70	37	93		276	0	100	246	0	....	692	326	......	....	7.7	ATL; Coconino Sandstone.
	11-17-59	.....	10	....	70	43	133		276	0	90	226	.5	....	710	354	......	....	7.3	Do.
	11-17-64	17	12	....	38	44	178		150	8	123	280	.2	....	758	274	138	1,370	8.6	Coconino Sandstone.
	10-25-65	.....	8	....	92	10	294		288	0	230	308	.3	....	1,090	370	......	....	7.5	ATL; Coconino Sandstone.

See footnote at end of table.

Table 4. --Chemical analyses of water from selected wells and springs in southern Coconino County—Continued

Well or spring location	Date of collection	Temperature (°C)	Silica (SiO$_2$)	Iron (Fe), in solution at time of analysis	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO$_3$)	Carbonate (CO$_3$)	Sulfate (SO$_4$)	Chloride (Cl)	Fluoride (F)	Nitrate (NO$_3$)	Dissolved solids	Hardness as CaCO$_3$		Specific conductance (micromhos at 25° C)	pH	Remarks
																Calcium, magnesium	Noncarbonate			
(A-18-14)13bad	1-10-63	.....	10	....	113	12	64		249	0	111	106	0.4	....	541	330	.....	....	7.6	ATL; Coconino Sandstone and Supai Formation.
	10-16-64	.....	10	....	116	8	152		300	0	100	214	.3	....	750	322	.....	....	7.6	Do.
	10-26-65	.....	.....	....	76	12	288		300	0	250	254	.2	....	1,040	340	.....	....	7.6	Do.
13cab	1-8-55	.....	8.2	....	64	32	14		251	0	90	16	1.2	....	351	290	.....	....	7.9	ATL; Coconino Sandstone.
	3-3-66	.....	.....	....	66	36	7.1		257	0	99	11	2	....	348	314	.....	587	7.6	Coconino Sandstone.
13dbb	4-27-55	.....	5.2	....	65	35	13		246	0	110	12	0	....	366	306	.....	....	7.8	ATL; Coconino Sandstone and Supai Formation.
	10-25-65	.....	.....	....	74	9	133		288	0	215	36	.2	....	620	320	.....	....	7.6	Do.
36daa	8-2-50	.....	.....	....	....	....	....		259	0	....	90	.....	....	....	308	.....	887	....	Coconino Sandstone.
	5-3-66	17	.....	....	72	37	55		255	0	122	82	.1	....	494	332	123	844	7.7	Do.
(A-18-15)5abb	3-2-66	.....	11	0	78	39	302		246	0	140	470	.3	....	1,160	354	153	2,080	7.5	Do.
30bcc	7-28-65	.....	.....	....	79	41	469		237	0	155	730	.3	....	....	364	170	2,890	7.7	Do.
(A-19-12½)13bad	11-1-66	.....	15	.01	103	54	46		194	0	358	34	.3	....	706	480	321	992	7.7	Do.
15cbb	6-22-66	19	22	.05	50	49	17		230	0	154	12	.1	....	417	328	140	652	7.2	OT; Coconino Sandstone.
(A-19-13)5adc	6-18-66	.....	16	0	101	34	28		236	0	212	29	.3	....	537	394	201	805	7.5	Coconino Sandstone.
7bbb	11-20-33	.....	.....	....	94	44	16		224	0	226	21	0	1.0	512	415	.....	....	....	Do.
	6- -66	.....	14	.01	91	40	18		230	0	205	21	.2	....	502	392	204	778	7.5	Do.
23abb	6-18-66	.....	30	0	10	36	53		302	0	....	21	.2	....	309	172	0	512	8.0	Do.
29bab	5-11-66	.....	16	0	114	32	27		226	0	250	22	.1	....	572	418	233	828	7.3	Do.
(A-19-14)2aa	10-11-65	.....	.....	.07	100	42	581	3.9	231	6.3	224	898	.1	2.2	a/1,990	425	236	3,400	7.9	GSL; Coconino Sandstone.
	9-21-66	.....	11	.01	158	50	574		238	0	328	930	.2	....	2,170	600	405	3,800	7.2	Coconino Sandstone.
2ba	8-21-54	.....	13	....	74	42	550		244	0	175	830	.1	....	....	358	.....	2,800	7.8	GSL; Coconino Sandstone.
	11-3-58	16	11	.01	76	39	460		241	0	152	705	.4	.8	1,560	350	152	2,810	7.3	Coconino Sandstone.
4acc	3-8-54	16	11	....	76	42	158		258	0	132	250	.6	1.8	798	362	150	1,420	....	Do.
4bbb	8-19-66	18	14	.12	78	40	157		264	0	153	227	1.9	....	801	358	142	1,340	7.5	Do.
21a	11-11-33	.....	.....	....	79	47	239		264	0	135	392	0	.4	1,020	390	.....	....	....	Do.
	5-11-66	16	15	0	73	47	260		265	0	135	413	.1	....	1,070	374	157	1,890	7.3	Do.
(A-19-16)6acb	4-30-65	.....	.....	....	78	25	430		272	0	162	595	.6	....	1,380	296	73	2,560	7.6	CT; Coconino Sandstone
(A-20-8)18bbb	2-14-63	18	13	....	44	25	6.4	1.9	256	0	5.6	7.8	.4	1.0	231	211	1	411	7.5	Coconino Sandstone and Supai Formation.
(A-20-12½)1ddd	5-12-66	16	11	0	86	45	36		198	0	253	36	.1	....	565	398	236	832	7.5	Coconino Sandstone.

See footnote at end of table.

Table 4. --Chemical analyses of water from selected wells and springs in southern Coconino County—Continued

Well or spring location	Date of collection	Tem-perature (°C)	Silica (SiO_2)	Iron (Fe), in solution at time of analysis	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Remarks
																Calcium, magnesium	Non-carbonate			
(A-20-12½)14dda	11-20-33	.....	.....	....	108	50	25		226	0	295	26	0	1.2	616	475	.....	....	....	Coconino Sandstone.
	3-12-53	.....	7.6	....	98	47	20		207	0	269	22	.3	.2	566	438	268	859	....	Do.
24cbb	7-8-46	.....	.....	......	105	45	31		225	0	280	26	0	1.7	600	447	262	891	....	CT; Coconino Sandstone.
	5- -66	.....	13	0.01	106	44	30		224	0	281	24	.2	....	608	446	263	890	7.5	Do.
(A-20-13)21da	5-11-66	16	.....	0	87	42	63		223	0	193	100	1	....	....	388	206	975	7.6	Coconino Sandstone.
35da	11-20-33	.....	.....	....	78	43	33		232	0	157	63	0	.2	488	371	.....	....	....	Do.
	3-12-53	.....	12	....	78	40	33		233	0	143	64	.2	.4	486	359	168	808	....	Do.
	5-12-66	. .	13	07	76	40	36		236	0	147	62	.1	...	490	356	163	799	7.6	Do.
(A-20-14)7b	5-11-66	.....	11	.01	98	50	111		236	0	225	189	0	....	800	452	259	1,360	7.5	Do.
(A-21-2)3ba	8-17-63	11	67	....	28	6.8	14		134	0	5.2	9.2	.2	.7	197	98	0	243	7.3	Volcanic rocks.
(A-21-5)2abc1	8-22-49	.....	20	....	29	13	9		127	0	22	13	0	.2	169	126	22	280	....	CT; volcanic rocks and silt.
11cbc	10-31-55	.....	12	.01	23	5.5	5.5		97	0	6.4	2.8	.1	1.7	105	80	0	172	7.8	Supai Formation.
(A-21-6)35cba	12-15-54	11	21	....	21	13	7.4		140	0	2.3	3.0	.2	.7	138	106	0	222	....	Coconino Sandstone and Supai Formation.
35ccc	4-3-58	.....	56	....	31	13	15		178	0	9.1	5.0	.3	1.0	218	131	0	288	8.2	Do.
(A-21-7)22aad	10-31-56	.....	.....	....	......	....	....		243	0	....	14	.....	....	....	217	18	419	7.6	Supai Formation.
32bbc	10-2-56	11	.....	....	......	....	....		260	0	....	3.0	.....	....	....	231	18	406	7.9	Coconino Sandstone and Supai Formation.
(A-21-9)14acc	5-16-66	12	13	0	31	18	7.6		156	0	10	21	.1	....	178	152	24	317	7.6	Do.
(A-21-11)24d	9-7-50	16	12	....	102	63	62		148	0	424	58	.2	2.2	796	514	392	1,160	....	Coconino Sandstone.
(A-21-12)3cb	3-15-55	.....	.....	....	70	41	....		216	0	....	23	.....	....	....	343	166	856	7.4	Do.
17bd	4-22-55	16	11	....	67	40	100		190	0	312	48	.4	.2	672	334	178	1,020	7.3	Do.
(A-21-12½)14ac	9-7-50	17	11	....	90	48	23		202	0	264	22	.2	1.4	560	422	256	840	....	Do.
(A-21-13)4ba	9-8-65	.....	.....	.03	102	43	74	4	198	10	222	107	.15	.4	a/744	430	268	1,190	8.0	GSL; Kaibab(?) Limestone and Coconino Sandstone.
22ad	9-7-50	17	12	....	98	53	136		235	0	246	218	.2	1.5	881	462	270	1,470	....	Coconino Sandstone.
35bc	5-11-54	21	14	....	102	45	85		218	0	255	127	.2	.8	736	440	261	1,170	....	Do.
(A-21-14)9dd	5-11-54	17	13	....	105	51	807		280	0	204	1,260	.3	6.2	2,580	472	242	4,550	....	Kaibab Limestone and Coconino Sandstone.
25cc	10-12-55	16	10	....	131	52	1,710		299	0	444	2,510	.6	5.6	5,010	541	296	8,340	7.2	Coconino Sandstone.
(A-22-4)26dc	8-15-50	11	28	....	22	9.8	15		123	0	13	8	.4	2.5	160	96	0	241	....	Volcanic rocks.
(A-22-8)35aac	1-11-67	.....	15	.18	28	14	6.2		146	0	7.0	12	.2	....	154	130	10	290	7.5	Supai Formation.
(A-22-9)29bac	8-9-62	.....	12	....	24	11	12	1.6	110	0	7.2	19	.3	8.4	150	107	17	265	7.2	CT; Supai Formation.

See footnote at end of table.

Table 4. --Chemical analyses of water from selected wells and springs in southern Coconino County—Continued

Well or spring location	Date of collection	Temperature (° C)	Silica (SiO$_2$)	Iron (Fe), in solution at time of analysis	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO$_3$)	Carbonate (CO$_3$)	Sulfate (SO$_4$)	Chloride (Cl)	Fluoride (F)	Nitrate (NO$_3$)	Dissolved solids	Hardness as CaCO$_3$ Calcium, magnesium	Hardness as CaCO$_3$ Noncarbonate	Specific conductance (micromhos at 25° C)	pH	Remarks
(A-22-10)3aca	7-18-65	.....	......	....	49	53	33		182	0	221	25	0.3	.....	....	342	193	756	7.5	CT; Supai Formation.
(A-22-11)19cc	10-20-54	.....	11	....	45	25	22		138	0	116	19	.4	0.8	307	216	102	513	....	Coconino Sandstone.
35bc	11-20-53	15	12	....	41	20	4.1		211	0	11	4.5	.4	1.8	199	184	12	346	....	Coconino Sandstone and Supai Formation.
(A-22-12)11cb	4-14-53	17	12	....	94	44	63		208	0	230	100	.2	.8	646	416	245	1,030	....	Coconino Sandstone.
15ab	8-19-51	.....	13	....	102	49	214		209	0	258	340	.2	2.4	1,080	456	284	1,840	....	Do.
17bc	3-22-55	16	......	....	90	46	....		221	0	......	37	.....	.....	....	414	232	921	7.5	Do.
25dd	11-2-53	.....	13	....	94	44	26		217	0	235	34	.6	1.0	555	416	238	846	....	OT; Coconino Sandstone.
(A-22-12½)36cd	9-8-65	.....	......	.03	98	38	55	2.7	177	13	249	76	.2	1.2	a/676	400	255	1,020	8.0	GSL; Coconino Sandstone.
(A-22-13)18ad	9-8-50	.....	11	....	102	59	192		250	0	262	308	.2	1.3	1,060	497	292	1,770	....	CT; Kaibab Limestone and Coconino(?) Sandstone.
18bc	9-7-65	.....	......	.03	96	50	131	3.3	207	12	240	201	.2	1.0	a/908	445	276	1,470	7.8	GSL; Kaibab(?) Limestone and Coconino Sandstone.
18cb	9-7-65	.....	......	....	98	50	129	3.6	266	12	226	194	.2	1.2	a/906	450	282	1,430	7.9	Do.
18da	9-7-65	.....	......	.03	98	50	161	3.3	221	9.0	239	249	.2	.4	a/1,020	450	268	1,620	....	GSL; Kaibab Limestone and Coconino Sandstone.
CR (A-23-8)16dcd2 ...	5-5-65	16	36	.02	148	35	19	2.2	644	0	3.2	5.0	.4	8.8	575	512	0	945	6.9	Supai Formation.
(A-23-10)1bb	10-19-54	.....	8.5	....	57	47	159		205	0	213	205	.8	.3	792	336	168	1,330	....	Coconino(?) Sandstone.
	7-19-65	.....	......	....	73	57	147		200	0	230	236	.5	.....	....	416	252	1,440	8.0	Do.
13dc	10-19-54	.....	12	....	93	59	370		172	0	270	605	.6	3.2	1,500	474	334	2,590	....	Do.
	7-18-65	.....	......	....	89	65	359		.....	0	255	615	.6	.....	....	490	353	2,610	7.6	Do.
(A-23-11)28a	6-10-51	.....	12	....	104	59	365		201	0	275	598	.2	2.0	1,510	502	338	2,610	....	Coconino Sandstone.
(A-23-12)17dc	4-7-55	.....	13	....	83	62	259		235	0	262	395	.2	2.7	1.190	462	270	2,020	7.8	Do.
26c	5-11-54	19	13	....	91	48	141		220	0	219	228	.4	.5	849	424	244	1,430	....	Do.
(A-24-5)11cac	7-7-65	11	.....	....	12	10	11		98	0	7	5.5	< .2	.....	....	72	0	186	8.0	Volcanic rocks and sand.
(A-25-6)20bdd	6-25-65	.....	......	....	42	16	14		174	0	18	28	.1	.....	....	169	27	407	8.1	Volcanic rocks.
(A-25-9)6cca	1-25-67	20	16	.02	102	48	60		452	0	83	90	.5	.....	622	454	84	1,050	7.4	Supai Formation.
PA (A-25-10)30bca	10-27-58	19	10	....	69	62	218		224	0	200	360	.8	1.3	1,030	427	244	1,850	7.7	Coconino Sandstone.
	2-1-61	19	10	....	76	68	244		243	0	219	405	.2	1.1	1,140	468	269	1,990	7.8	Do.
(A-26-8)1b	10-5-66	.. ..	18	01	212	68	71		890	0	92	98	.8	.....	998	810	80	1,630	6.8	CT; Coconino Sandstone and Supai Formation.

See footnote at end of table.

Table 4.--Chemical analyses of water from selected wells and springs in southern Coconino County—Continued

Well or spring location	Date of collection	Temperature (° C)	Silica (SiO_2)	Iron (Fe), in solution at time of analysis	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids	Hardness as $CaCO_3$		Specific conductance (micromhos at 25° C)	pH	Remarks
																Calcium, magnesium	Noncarbonate			
(A-26-10)9cda	11-10-66	.....	12	0.02	146	91	2,600		284	0	450	4,200	0.4	.....	7,640	740	508	12,900	7.9	CT; Coconino Sandstone.
31ca	10-26-54	.....	9.4	....	67	62	257		240	....	198	408	.8	1.7	1,120	422	......	2,010	....	Do.
(A-27-9)6dc1	5-15-56	17	11	....	101	58	27		536	0	32	53	.4	.6	547	490	51	980	7.5	CT; Supai Formation.
	5-12-66	.....	.....	0	95	62	39		527	0	43	70	.4	.....	....	492	60	1,000	7.6	Supai Formation.
6dc2	5-12-66	.....	14	0	102	57	41		532	0	43	68	.5	.....	588	490	54	1,000	7.2	Do.
7abb	5-12-66	.....	15	0	85	71	36		564	0	39	58	.2	.....	582	506	44	1,010	7.5	CT; Supai Formation.
11ddd	11-12-66	.....	10	.02	66	91	1,380		276	0	280	2,150	.5	.....	4,110	540	314	7,220	7.8	Coconino Sandstone.
(A-27-10)6abc	11-10-66	.....	16	.02	8.0	2.4	236		370	0	148	54	3.8	.....	766	30	0	1,050	7.7	Chinle Formation (Shinarump Member).
(A-28-8)36bac	6-20-58	18	15	....	77	39	38		441	0	36	24	.7	.1	447	352	0	776	7.7	Coconino Sandstone.
(A-28-9)35bac	4-5-55	17	9.1	....	95	63	927		265	0	250	1,440	.5	3.8	2,920	496	279	5,180	7.3	Kaibab Limestone.
(A-29-9)22dca	4-20-51	.....	13	....	118	61	973		300	0	258	1,520	.3	1.9	3,090	546	300	5,480	....	Kaibab Limestone and Coconino Sandstone.
(A-30-2)25c	12- -63	.....	.....	< .5	124	41	10		.....	....	255	21	.3	.....	[a]658	480	......	....	....	ASHL; Toroweap Formation.
(A-31-2)7	10-16-57	.....	9.2	....	52	31	27		267	0	33	44	.2	.1	328	257	38	584	....	Hermit Springs; Muav Limestone.
13abb	4-9-58	12	12	....	54	35	11		308	0	28	14	.2	.2	305	278	26	543	....	Indian Gardens Spring; Muav Limestone.
(A-32-7)31b	6-14-50	.....	19	....	264	79	534		964	0	147	815	.2	3.2	2,340	984	194	3,940	....	Blue Spring; Muav Limestone.
	5-17-66	21	17	0	252	76	535		951	0	140	835	.3	.....	2,320	940	161	3,960	6.8	Do.
(A-33-6)33b	5-17-66	22	17	0	112	77	761		464	0	170	1,200	.2	.....	2,560	595	215	4,540	7.3	Composite of all spring flow from Blue Spring to mile 3.1; Muav Limestone.
	7-12-66	24	15	0	120	79	765		494	0	170	1,210	.2	.....	2,600	625	......	4,580	7.8	Do.
(B-23-7)10cdd	1963	.....	.....	1.26	23	33	86		380	<.1	5.9	57	.8	<1.0	....	190	......	770	7.9	ASHL; Redwall Limestone and Martin(?) Limestone.
(B-27-6)1adc	5-2-66	.....	.....	....	486	106	30		93	0	1,480	70	.6	.....	2,220	1,650	1,580	2,580	7.8	Alluvium.
(B-27-9)16d	5-15-58	22	26	....	50	21	18		228	0	15	24	.5	15	282	212	......	460	....	Diamond Spring; Muav Limestone.
(B-28-7)31c	4-25-66	.....	.....	....	78	10		1.4	234	0	25	16	.2	.....	246	238	46	496	7.5	CT; alluvium.
(B-28-8)24daa	4-25-66	.....	.....	....	62	10		2.3	213	0	8.0	14	.2	.....	202	198	24	399	7.5	Alluvium.
(B-29-1)12dbd	10-14-66	.....	12	.02	134	33	14		264	0	262	8.0	.6	.....	594	470	254	848	7.3	CT; Coconino Sandstone.
(B-30-1)28aaa2	6-3-58	19	10	....	229	64	27		225	0	667	8.5	.3	2.4	1,120	834	650	1,390	8.2	Coconino Sandstone.

See footnote at end of table.

Table 4. --Chemical analyses of water from selected wells and springs in southern Coconino County—Continued

Well or spring location	Date of collection	Temperature (° C)	Silica (SiO_2)	Iron (Fe), in solution at time of analysis	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids	Hardness as $CaCO_3$		Specific conductance (micromhos at 25° C)	pH	Remarks
																Calcium, magnesium	Noncarbonate			
(B-33-4)26	10-20-50	21	18	....	133	48	27		588	0	36	48	0.2	1.4	602	530	48	1,030	....	Havasu Spring; Pennsylvanian limestone unit.
	8-7 65	. ...	......	.. ...	74	45	....	......	416	0	36	48	.2	.....	. ..	368	......	820	7.7	Do.
(B-33-7)30(?)	6-2J-60	26	......	....	54	80	58		532	0	38	80	.....	.....	572	462	26	1,100	....	Warm Spring; Muav Limestone.

a/ Total dissolved solids determined by residue on evaporation at 180°C.

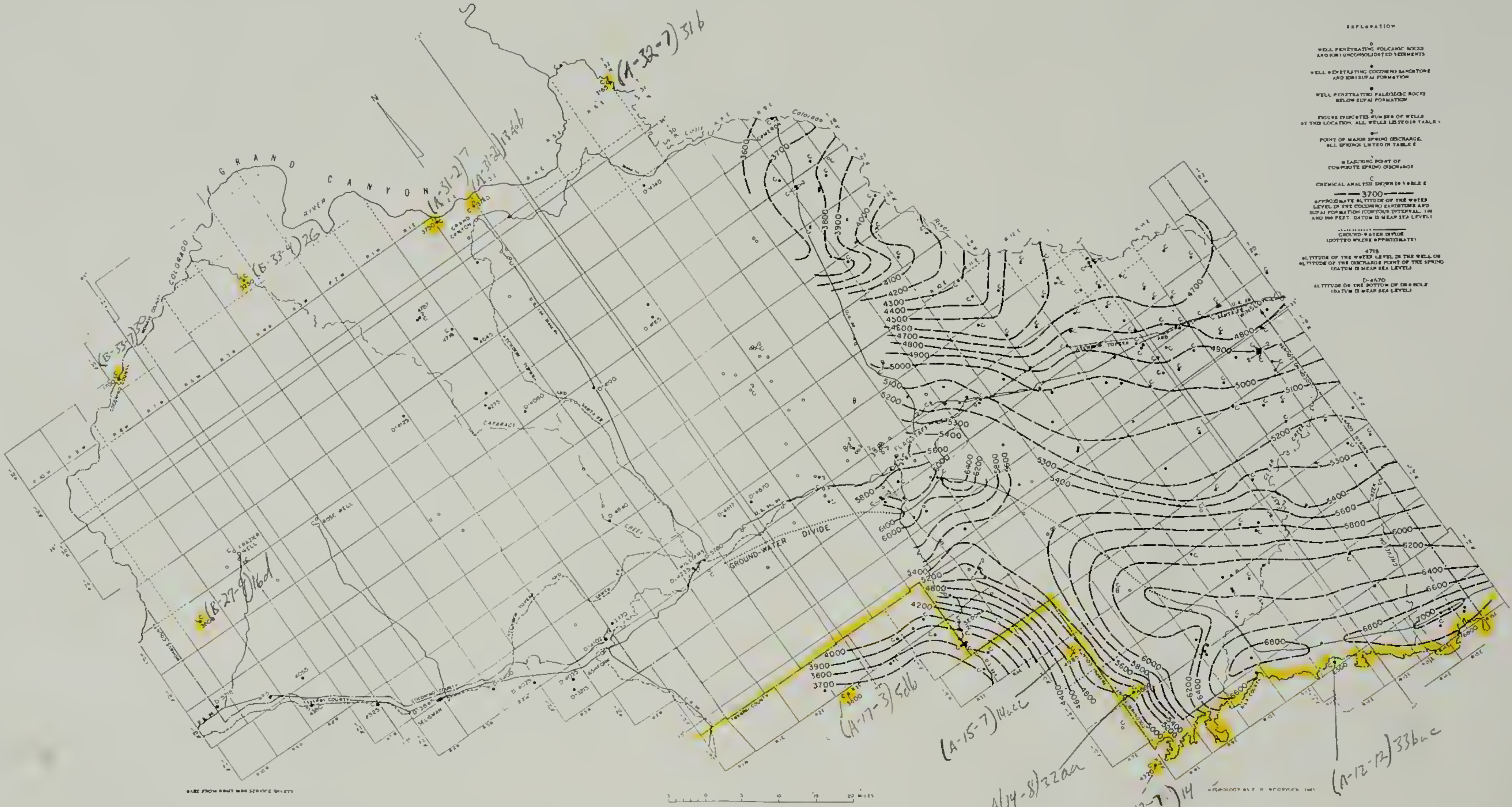
EXPLANATION
o
WELL PENETRATING VOLCANIC ROCKS AND (OR) UNCONSOLIDATED SEDIMENTS
◆
WELL PENETRATING COCONINO SANDSTONE AND (OR) SUPAI FORMATION
●
WELL PENETRATING PALEOZOIC ROCKS BELOW SUPAI FORMATION
2
FIGURE INDICATES NUMBER OF WELLS AT THIS LOCATION. ALL WELLS LISTED IN TABLE 1
POINT OF MAJOR SPRING DISCHARGE. ALL SPRINGS LISTED IN TABLE 2
MEASURING POINT OF COMPOSITE SPRING DISCHARGE
C
CHEMICAL ANALYSIS SHOWN IN TABLE 3
3700
APPROXIMATE ALTITUDE OF THE WATER LEVEL IN THE COCONINO SANDSTONE AND SUPAI FORMATION (CONTOUR INTERVAL 100 AND 200 FEET. DATUM IS MEAN SEA LEVEL)
GROUND-WATER DIVIDE (DOTTED WHERE APPROXIMATE)
4718
ALTITUDE OF THE WATER LEVEL IN THE WELL OR ALTITUDE OF THE DISCHARGE POINT OF THE SPRING (DATUM IS MEAN SEA LEVEL)
D-4670
ALTITUDE OF THE BOTTOM OF DRY HOLE (DATUM IS MEAN SEA LEVEL)
N
GRAND CANYON
COLORADO RIVER
Little Colorado River
CAMERON
GRAND CANYON
FLAGSTAFF
WILLIAMS
SELIGMAN
WINSLOW
CATARACT
GROUND-WATER DIVIDE
COCONINO COUNTY
YAVAPAI COUNTY
(A-32-7)31b
(A-31-2)7
(A-31-2)13ab
(B-33-4)26
(B-33-7)20
(B-27-9)16d
(A-17-3)5bb
(A-15-7)14cc
A(14-8)32aa
(A-12-7)14
(A-12-12)33bac
BASE FROM GOVT MAP SERVICE SHEETS
0 5 10 15 20 MILES

FIGURE 4.--LOCATION OF SELECTED WELLS AND SPRINGS AND ALTITUDE OF THE WATER LEVEL IN THE COCONINO SANDSTONE AND SUPAI FORMATION, JUNE 1967, SOUTHERN COCONINO COUNTY.

ARIZONA STATE LAND DEPARTMENT WATER-RESOURCES REPORTS
(Continued from inside front cover)

No.

17. Effects of ground-water withdrawal, 1954-63, in the lower Harquahala Plains, Maricopa County, Arizona, by R. S. Stulik: 8 p., 5 figs., 1964.

18. Basic ground-water data for western Pinal County, Arizona, by W. F. Hardt, R. E. Cattany, and L. R. Kister: 59 p., 4 figs., 1964.

19. Annual report on ground water in Arizona, spring 1963 to spring 1964, by N. D. White, R. S. Stulik, E. K. Morse, and others: 60 p., 27 figs., 1964.

20. Hydrologic and drill-hole data, San Xavier Indian Reservation and vicinity, Pima County, Arizona, by L. A. Heindl and N. D. White: 48 p., 3 figs., 1965.

21. Basic hydrologic data for San Simon basin, Cochise and Graham Counties, Arizona, and Hidalgo County, New Mexico, by N. D. White and C. R. Smith: 42 p., 4 figs., 1965.

22. Bibliography of U.S. Geological Survey water-resources reports, Arizona, 1891 to 1965, compiled by the Arizona District, Water Resources Division, U. S. Geological Survey: 59 p., 1965.

23. Geohydrology of the Dateland-Hyder area, Maricopa and Yuma Counties, Arizona, by W. G. Weist, Jr.: 46 p., 8 figs., 1965.

24. Annual report on ground water in Arizona, spring 1964 to spring 1965, by N. D. White and others: 62 p., 22 figs., 1965.

25. An appraisal of the ground-water resources of Avra and Altar Valleys, Pima County, Arizona, by N. D. White, W. G. Matlock, and H. C. Schwalen: 66 p., 12 figs., 1966.

No.

26. Basic hydrologic data of the Hualapai, Sacramento, and Big Sandy Valleys, Mohave County, Arizona, by J. B. Gillespie, C. B. Bentley, and William Kam: 39 p., 6 figs., 1966.

27. Basic ground water data for western Salt River Valley, Maricopa County, Arizona, by William Kam, H. H. Schumann, L. R. Kister, and F. E. Arteaga: 72 p., 11 figs., 1966.

28. Anticipated changes in the flow regimen caused by the addition of water to the East Verde River, Arizona, by H. W. Hjalmarson and E. S. Davidson: 10 p., 3 figs., 1966.

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30. Hydrologic conditions in the Douglas basin, Cochise County, Arizona, by N. D. White and Dallas Childers: 26 p., 9 figs., 1967.

31. Compilation of flood data for Maricopa County, Arizona, through September 1965, by L. L. Werho: 36 p., 1 fig., 1967.

*32. Annual report on ground water in Arizona, spring 1965 to spring 1966, by E. B. Hodges and others: 61 p., 22 figs., 1967.

33. Basic ground-water data for southern Coconino County, Arizona, by E. H. McGavock: 49 p., 4 figs., 1968.